

AUTOMOTIVE INDUSTRIES

VOLUME 62

Philadelphia, Saturday, March 15, 1930

NUMBER 11

Equipment Wholesalers Necessary in Dealer-Service Program

When the car factory considers adding shop machinery to the line of products sold to its retailers, the desire to improve vehicle sales should be paramount in its plans.

By LEON F. BANIGAN

Editor, Motor World Wholesale

At least two major car manufacturers are looking upon shop equipment as an item to be distributed to their dealers by the factory service departments. The situation is fraught with advantages and disadvantages from the standpoint of both the car manufacturers and the automotive wholesalers.

Whether car factory participation in the distribution of shop equipment proves advantageous to the car maker, the automotive wholesaler or the car dealers, will depend largely on the manner in which the plan is set up.

The idea has pitfalls for the average car manufacturer which, we do not believe, he fully appreciates at the present time—and there's no reason why he should, considering his general lack of information and experience in service equipment distribution.

On the other hand, the idea has interesting possibilities—from the standpoint of the car factory, the wholesaler and the car dealer, when and if a plan of shop equipment distribution is set up with the benefits to the car dealer organizations primarily in mind.

Let's consider this matter of active car factory participation in shop equipment distribution from both angles.

When a car factory, in this day and age, considers adding shop equipment to the products it sells to its car dealers, it is usually actuated by one or both of these motives:

1. *Desire to inspire and assist its dealer organization toward better equip-*

ment of their shops and better merchandising of their services, in order to make the dealers better factory representatives in their territories.

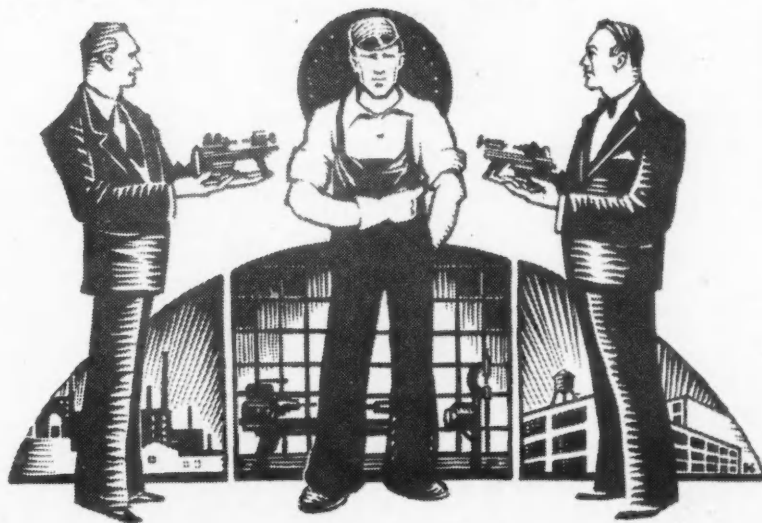
2. *Desire to obtain for the service department of the car factory a profit on shop equipment distribution in order to make the factory service department more self-sustaining.*

If the first motive is primary in the scheme of the car manufacturer, he probably will be found to be in a frame of mind to receive favorably information and advice from men of experience and ability in the shop equipment business. If, on the other hand, the car factory organization is interested primarily in the profits that can be diverted to factory service departments, there are grave dangers ahead for both the car factory and its dealers—and for the automotive wholesalers who, up to the present time, have been rendering the car factories a very important service by teaching the car factory's own dealers the necessity for modern equipment in the shops, and demonstrating, delivering and often financing the sale of shop equipment to them. Car dealer profits per new

car unit have trended downward in the past few years, and not the least important effect of this condition upon the car factories has been the pressure for more discount.

Whether justified by facts or not, the impression exists in some quarters that the car factories have enjoyed considerable prosperity at the expense of their dealer organizations during the past few years.

If car factories



should accomplish a measure of success in shop equipment distribution, thus taking from the wholesalers the profit they now enjoy on this type of merchandise, it might be necessary for the wholesalers to increase their prices to dealers on the multitude of other service items and other elements of service which the car dealers find it necessary to buy from wholesalers and which the factories cannot furnish.

It is practically impossible for the average dealer to function without the services provided by local wholesalers—and so, in the long run, the taking over of some of the functions of the wholesaler by the car factories probably will result only in the dealers paying higher prices for the merchandise and service now rendered by the wholesalers on those items which no car manufacturer now, or ever conceivably in the future, can furnish for their dealers.

Reducing Dealers' Profits

And the net result would appear to be, of course, only a further reduction of the dealer's profit possibilities to the profit advantage of the car manufacturer.

However, the question of profitable distribution of shop equipment by car factories is even more impressive, and its attainment by car factories more doubtful.

Possibly the car factories at the present time see only the gross discount allowed jobbers. Perhaps they think that the gross discount is mostly net profit, except for a small salesman's commission. Does the car factory believe that its service men can sell shop equipment provided they are supplied with a catalog and price list?

If that were possible gross discounts to jobbers would not range around 30 per cent as they do at the present time and the shop equipment marketing business would be a bed of roses for both equipment manufacturers and jobbers.

Car factories that have contemplated distribution of general service equipment (special tools are not included in this discussion) do not seem to realize that if their men are to do an intelligent and profitable job, it will be necessary for them to educate their men as the shop equipment manufacturers have for years educated jobber salesmen. Few if any of the car manufacturers appear to appreciate the responsibility to the equipment maker and to their dealers that they will carry—a responsibility that only can be justified by educating their men to do the job.

Unless this is done there will be considerable complaint on the part of their dealers and obviously the result of car factory distribution of shop equipment will not be one of more than temporary satisfaction to the equipment manufacturers.

The shop equipment business these days is presenting many major problems which are quite comparable in intensity with those encountered in new car marketing—not excluding the used equipment phase of the business which, within the last two or three

years, bids fair to assume proportions as threatening to both manufacturer and jobber profits as the used car problem.

The car factories, generally speaking, are distributing a few accessories—that is, the dozen or so major items which have become standard equipment on all cars, such as bumpers, shock absorbers, stop-lights, heat indicators, etc.

However, there is a vast fundamental difference between distributing accessories and distributing shop equipment. An accessory item or a line of accessories may be sold to dealers on the basis of the number of new cars sold. Accessories may be shipped to branches and distributors in large quantities and resold through them to retail dealers in quantities to take care of reasonably anticipated demand. Aside from simple installation instructions, there is little or no service phase to the accessory distribution problem.

Equipment Service Extensive

With shop equipment, however, it is quite different. To begin with, the car factory's own dealers have been educated to expect a very complete type of service from the organization that sells them shop equipment. There is probably no item among all the merchandise that a dealer buys upon which he has received more assistance than from the seller of shop equipment. This assistance actually begins when the jobber salesman first enters the dealer's place of business and first mentions a piece of equipment. It is often necessary to sell the dealer on the advantages and profits to be obtained from a certain line of repair work before he will consider the purchase of a piece of equipment designed to do that work in a more economical way.

And from that point, through the demonstration and sale of equipment, through its installation and often throughout the life of that piece of equipment, the dealer or repair shop leans heavily upon the jobber salesman who sold it.

We wonder if the average car factory organization has given sufficient consideration to any of these important questions in connection with the distribution of shop equipment.

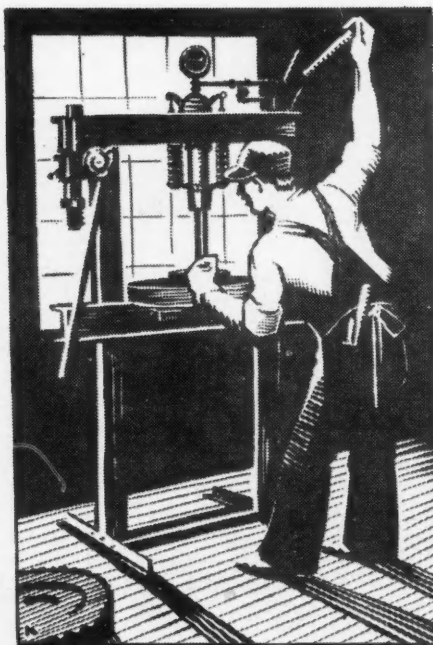
Will the car manufacturer warehouse shop equipment at the factory or in the buildings of its branches and distributors or both, as the present set-up of shop equipment distribution through jobbers provides?

Will the car factory consign shop equipment to branches and distributors, or require them to buy shop equipment and stock it for prompt delivery to dealers?

Who will deliver, uncrate, assemble, lubricate, test and demonstrate the proper use of the equipment after it is sold?

Who, in the factory organization, will meet the wrath of the repairman who frantically wires the factory: "This garage jack is no good—it won't work"—when, as a matter of fact, the most serious thing wrong with the brand new jack is a drop of paint

(Continued on page 450)



Fiat Announces Lower-Priced Four With Increased Displacement

*Some of the advanced, but costly features
of design replaced in Model 514 by simpler
methods, reducing production costs*

FIAT announces a new four-cylinder model having a displacement of 87.7 cu. in., a wheelbase of 100¾ in., a track of 48 in., weighing 2200 lb., fully equipped with four-passenger sedan body, and having a speed of 51 m.p.h. Designated 514, this new model will replace the Model 509 introduced five years ago and which proved itself one of the most popular of European light cars in the world's markets. Although the engine displacement is increased by more than 27 cu. in., and the seating capacity is greater, it is understood that the new model will be sold at the same price as the model it replaces or even at a slightly lower price.

Model 514, the cheapest car to be produced by Fiat, has a piston displacement 45 per cent greater than the model it supplants, and some of the advanced but rather costly features of design have been replaced by simpler methods enabling production costs to be reduced.

The engine is an L-head type, with a three-bearing crankshaft, whereas the earlier model had an overhead, chain-driven camshaft with inclined valves. With a bore and stroke of 67 by 102 mm. (2.63 by 4.01 in.) and a compression ratio of 5.85 the output is 30 hp. at 3400 r.p.m. Cylinders and crankcase are one casting, with a detachable head, and a sheet steel stamping for the oil sump. Attachment to the chassis is by four points on semi-spherical rubber blocks.

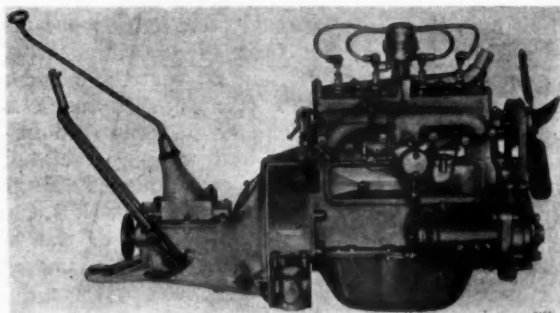
The transmission housing, which is an aluminum casting, and practically the only aluminum part in the car, is bolted up to the clutch housing, but also has a rear support on a bracket from the central cross-member.

The crankshaft diameter is 1.89 in. throughout, with three main bearings having a length of 1.77, 1.65 and 1.77 in. Connecting rods are I-section, with aluminum

By W. F. BRADLEY

alloy pistons having three compression rings and one scraper ring. Pistons and rods can be removed from below. The four-bearing camshaft is driven by a Morse-type silent chain, fitted

with an automatic tensioning device. The water pump is in the forward part of the cylinder casting and is driven by rubber belt from the crankshaft, the fan being on the pump shaft. High and narrow, the radiator is of Fiat construction and is distinctive in being a honeycomb type, although composed of vertical brass strips. Lubrication is under high pressure from a gear-



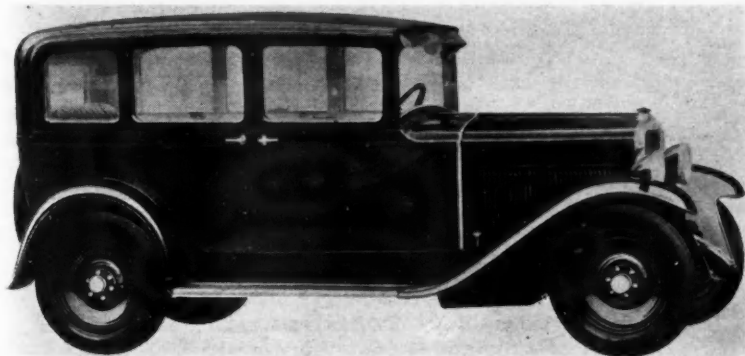
Fiat's 9 hp. engine and transmission

type pump driven off the camshaft, and delivering oil direct to main, connecting rod and camshaft bearings, as well as to the chain.

Ignition is by battery and Delco distributor, the latter being on the valve side of the cylinder casting, just above the head, and having 15 deg. automatic advance and an additional 15 deg. hand controlled advance. A six-volt set is used, the electric generator being driven by means of the camshaft chain, and the starting motor on the left-hand side engaging with a ring gear cut on the flywheel.

A horizontal Solex carburetor is used, the manifold being heated from the exhaust, and the gasoline being fed to it from a tank carried in the metal dashboard. The electrical equipment, with the exception of the six-volt 105 amp.-hr. battery and the Delco distributor, is of Fiat construction.

A four-speed transmission is fitted, contrary to the earlier model, which had only three speeds. The primary and secondary shafts are of big diameter, carried in ball bearings and have helically cut constant mesh pinions.



The Fiat Model 514 four-door sedan

Elimination of Waste in Production

*Savings of millions of dollars through
improper operational methods in
at the National*

By EDMUND
Research Department,

AMONG the many problems now confronting engineers and production men, if the slogan "organizing for permanent prosperity" is to become a fact during the next few years, two were considered outstanding at the National Management Congress held the first part of the week of March 3 at Chicago, and one in particular was particularly emphasized. The nature and number of papers presented on various phases of factory management and those discussing the elimination of waste in production operations clearly indicated the importance attached to them at the present time.

In order to give a broad view of conditions the meeting opened with an address "The Development of the Art and Science and Philosophy of Management Since Taylor," by Henry P. Kendall, president, Taylor Society, in which Mr. Kendall showed how most of the modern tendencies and trends in management and in production were but extensions and interpretations of Taylor's original principles. Present-day activities were traced through their development from these principles which this pioneer outlined more than 20 years ago and as a result it was Mr. Kendall's opinion that much more credit was due to Taylor than he had received in this country, although his work was well appreciated in Europe. This address was followed by one by Hugh P. Baker, director, Trade Association Division, U. S. Chamber of Commerce, in which the function of the trade association in providing material of use to management was outlined. What the trade association could and could not do in matters relating to commodity prices,

control of output and similar factors which have caused confusion and trouble in the past was brought out. He believed that such associations could be of material value in providing data of a research nature, in increasing profit margins and in dealing with all



Virgil M. Palmer,
engineer of Industrial Economy,
Eastman Kodak Co., whose method of waste elimination in operations was presented before the A.S.M.E.

phases of manufacture and distribution to a larger extent than at present and that many business problems could be solved in this way. Thought along these lines and as emphasized by Mr. Kendall was carried into the first evening session through the presentation of papers relating to distribution methods and means for simplifying and mechanizing the work of administration. Simultaneously with these sessions was that dealing with methods of preventing and eliminating waste in which so much interest was expressed.

Under the chairmanship of O. B. Zimmerman, International Harvester Co., Chicago, Virgil M. Palmer, engineer of Industrial Economy, Eastman Kodak Co., in his paper "The Elimination of Waste," showed the tremendous savings which could be brought about through reducing losses attributable to careless or improper operational methods. "The U. S. Department of Commerce recently estimated that a saving of from \$200,000,000 to \$500,000,000 a year is suggested as possible, from simplified handling alone, of the estimated \$80,000,000,000 yearly domestic business of our country, and that the total annual waste of distribution is from 10 per cent to 12½ per cent of this, or, from \$8,000,000,000 to \$10,000,000,000.

"C. E. Knoeppel in his paper 'Dividend Requirements From Waste Elimination,' in the Society of Industrial Engineers' Bulletin of January, 1929, estimates that, through 'the release of mental energy' of the workers and supervision, and 'through the elimination of waste in materials only, by supervision,' a total yearly saving to industry of from \$1,500,000,000 to \$1,750,000,000 may be effected.

"According to the magazine, *Thrift*, the American Scrap Industry has attained a place in big business with an annual turnover of more than \$1,000,000,000.

"If these figures seem too large or exaggerated, just consider the following:

"C. H. Knight states in *The General Electric News* that the cost of the total material scrapped yearly in all the plants of this well-managed company (the General Electric Co.) amounts to \$20,000,000 and that this is equal to half of the total labor cost; further, that it amounts to 10 cents on every \$1 of output. The salvage value is less than \$4,000,000, leaving a net loss of over \$16,000,000. The total amount of scrap metal is 225,000,000 lb., costing when new over \$14,000,000 and representing, after salvage, a net loss of over \$10,000,000."

"There are three classes of waste, i. e., waste of energy, waste of time and waste of material.

"Waste exists in almost countless forms and comes

Stressed by *A. S. M. E. in Chicago*

reduction of losses due to careless or industry indicated by speakers Management Congress.

B. NEIL

Chilton Class Journal Co.

from almost countless causes. At times, its presence is obvious; at others, it is invisible, wearing away insidiously the structure of sound business and industry.

The presence of waste can readily be detected by use of a simple and elementary formula expressed in terms of efficiency.

For waste elimination there are four essentials: 1—Mental Attitude; 2—Knowledge and Facts; 3—Waste Consciousness, and 4—Action.

As indicative of waste elimination methods in automobile manufacturing, W. E. Roe, Oakland Motor Car Co., although unable to be present at the Congress, presented (by title) a paper dealing with the conservation of material in manufacturing operations showed among other savings how the amount of excess material in the seven forgings from which gears for the Pontiac transmission are made was reduced so that a saving in material and labor enabled a reduction of 36 cents or a yearly total of \$54,000 was attained. R. Chalmers of the same company then described a method whereby through the use of thinner lumber and other changes in the box used by Oakland, Pontiac and by Chevrolet, \$133,000 was saved on sheathing alone at the Chevrolet Bloomfield plant, \$14,750 on framing and \$59,000 on sheathing at the Tareytown plant.

R. R. Rees, manager, Maintenance and Construction Division, Packard Motor Car Co., in his paper "Organization for Plant Maintenance," presented organization charts, record forms and similar material describing the Packard system of control. He concurred with Mr. Brandt in the benefits to be derived from an incentive system for this work, and brought out that the duties involved at present are quite different from what they were 10 years ago. Buying for maintenance and repairs is on specification and approval by the maintenance department followed by purchase on a price basis. His company has found it economical to let excess construction work to outside contractors, thus maintaining a fixed number of men on the payroll of the maintenance department. At present 71 men are engaged in repair or maintenance work and 42 on construction work, a total of 3550 labor hours weekly. Even the simplest of routine operations such as window washing, lamp cleaning and scrubbing are done on schedule.

In the session on "Managerial Education and Training," R. H. Spahr, General Motors Institute, showed that whereas college trained men were engaged in engineering, chemical and managerial occupations in larger numbers, those in production work were comparatively few. Men in production activities seem to come most

largely from the technical institutes, trade schools and similar instructional schools. Charts were presented to show as conclusively as possible the results of many analyses of the sources whence men for all classes of managerial work are obtained.

C. B. Auel, Westinghouse Electric & Manufacturing Co., described in detail the methods followed by his company in the establishment and continuation of the elimination of waste campaigns which have been successful for many years.

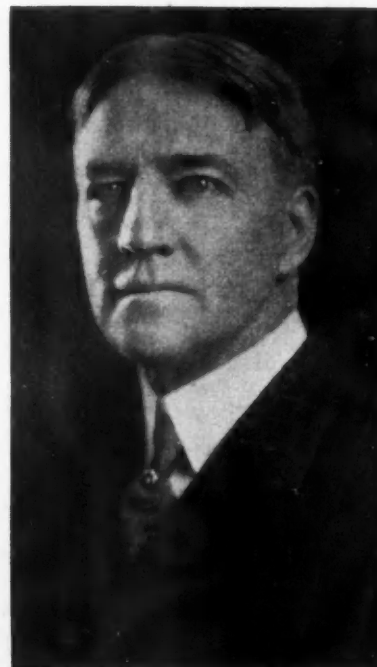
"The producer of the scrap is usually his own best customer and only after investigation has proven he cannot make use of it in some way should effort then be made to dispose of it to outside parties.

"An example, one of a number as illustrating what can really be done in this way, occurred some years ago in our own company in connection with leather belting.

"After some treatments bad spots were cut out, replaced by good leather and the belting put back into the same or a lighter service, or else went into the making of other belts. The bad pieces when cut out if single ply were sometimes made into hand leathers for the handling of various kinds of materials; sometimes they were turned into gaskets by the maintenance department; smaller pieces if still of sufficient size were sold to a concern which specialized in the manufacture of boot heels, while the scraps were either used by us as findings for tumbling barrels or else were sold for the making of carbonizing or fertilizing materials. We recently learned that concerns producing fiber board can use these leather scraps to advantage by shredding and introducing them into their products.

"While it is no doubt true as was pointed out by the American Engineering Council that management is responsible for over 50 per cent of the wastes which occur in the industries and labor for less than 25 per cent, it is equally

C. B. Auel, Westinghouse Electric & Mfg. Co., described his company's success in waste elimination campaigns at the A.S.M.E. meeting





R. W. Phillips, du Pont de Nemours Co. (left), and R. R. Rees, plant engineer, Packard Motor Car Co. (right), whose papers attracted attention when read before the National Management Congress in Chicago last week



Jervis B. Webb, president of the Jervis B. Webb Co., who was chairman of the conveyor and pneumatic handling session of the National Management Congress



true that management is more and more endeavoring to reduce its wastes through the medium of the supervisory force, but there seems to have been little attempted in the way of enlightening labor as to its share of the responsibility.

"The idea of inviting suggestions from the workers is more and more taking hold on management and probably more suggestion systems have been introduced into the industries within the past few years than in all of the previous years. The greatest difficulty found with suggestion systems is that while the mechanical routine has been developed, the crux of the entire matter, a systematic and logical method of paying for them, has in many cases not been worked out.

"Where savings due to a suggestion can be figured, a percentage of such should be given to the suggestor. With the majority of suggestions, however, it is not possible to do this, so several classes of awards should be established, and monetary awards are in general preferred to any other kind. Even when suggestions cannot be accepted but nevertheless lead to something being done, they should still be awarded if the suggestion system is expected to grow.

"In order to keep up the interest of the employees in our suggestion system and as recognizing the fact that as the ground becomes covered, it is increasingly difficult to make suggestions, we have a series of extra awards. Five dollars extra are paid when five suggestions have been accepted by us—this in addition to the award paid for each of the accepted suggestions. Ten dollars extra are paid for the second set of five accepted suggestions; \$15 for the third set of five, and so on.

"The first one of our employees has recently passed the century mark and received extra awards from \$5 to \$100 in increments of \$5 extra, making a total of \$1,050 extra paid him. This has been a greater amount than paid him for the 100 suggestions themselves but we feel it has been worthwhile and as a by-product it has served as an encouragement to others."

During the discussion of his paper Mr. Auel stated that from 25 to 30 per cent of the suggestions received were adopted in some form or another but that only

about 10 per cent of the men seemed capable or inclined to make them. During the 12 years that his system had been in use the nature of suggestions had changed from those relating to safety and methods of improving production to those dealing with means of reducing costs. Some 40 to 50 suggestions are received every two weeks, and from one to seven of these now refer to means of extending the use of jigs and fixtures.

R. W. Phillips, du Pont de Nemours & Co., in his paper "Disposition of Obsolete Buildings and Plants," showed what could be expected in the amounts to be returned from the disposal of various types of buildings and equipment, as based upon detailed analysis of costs and salvage values.

"From competent engineering sources we learn that the construction costs of the average industrial building or plant may be found in the following percentages:

	Buildings %	Plants %
Excavations	2	2
Foundations	10	10
Buildings above ground	18	18
Apparatus and equipment	70	60
Outside facilities	0	10
	100%	100%

"For the purposes of this discussion these figures have been broken down further into labor and materials, which, I am informed, are as follows:

	Building		Plants	
	Labor %	Materials %	Labor %	Materials %
Excavations	2	0	2	0
Foundations	5	5	5	5
Buildings above foundations	6	12	6	12
Apparatus and equipment	10	60	10	50
Outside facilities	0	0	5	5
	23%	77%	28%	72%

(This is near enough to call labor 25% and materials 75%.)

"This gives some idea of the basis on which the building or plant has been set up in the capital investment account, and on which the operations will be compelled to provide an obsolescence fund.

(Continued on page 441)

Chrysler Enters Lower-Price Field With Six at \$795 to \$845

Departures from the company's practice in engine design are found in the use of gears for front-end drive and the inclined accessories shaft.

By ATHEL F. DENHAM

ENTERING a new, lower-priced six-cylinder market, the Chrysler Corp. announces the Chrysler Six, a high performance car with a price range of from \$795 to \$845. The 195.6 cu. in. engine develops around 62 hp. at 3200 r.p.m.; the weight of the four-door sedan is approximately 2950 lb., and the rear axle reduction is 4.7 to 1.

There is a touch of novelty in the front end appearance, the normally chrome-plated front of the radiator header tank cover being finished in the form of a black grill, matching the radiator core proper. This style of finish gives the appearance of an unusually deep radiator.



The Chrysler Six front compartment, showing the three-spoke steering wheel and adjustable steering column

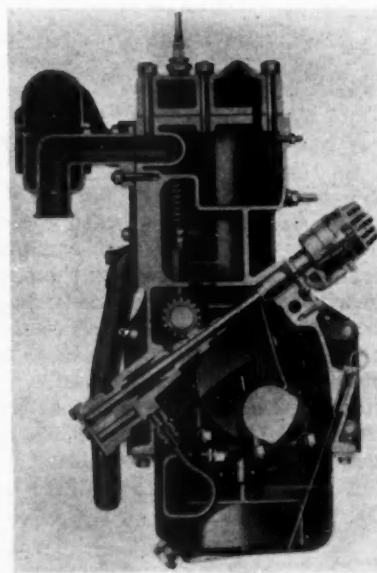
While wood is being used for a number of body parts such as the roof side rails, rear window frames, rear belt bars and upper trim rails, the body construction is largely of steel. The front end, consisting of the pillars, cowl bar, and windshield header bar, is a one-piece stamping, as is the cowl and

the under body. The latter includes the side sills, cross-members, floor pans and rear compartment floor "boards." Depressions and ribs are stamped in the steel sheets of this underbody stamping to prevent rumble. Doors also are of all-steel construction. Roof side panels are of the metal type.

Five body models comprise the Chrysler Six line, priced as follows:

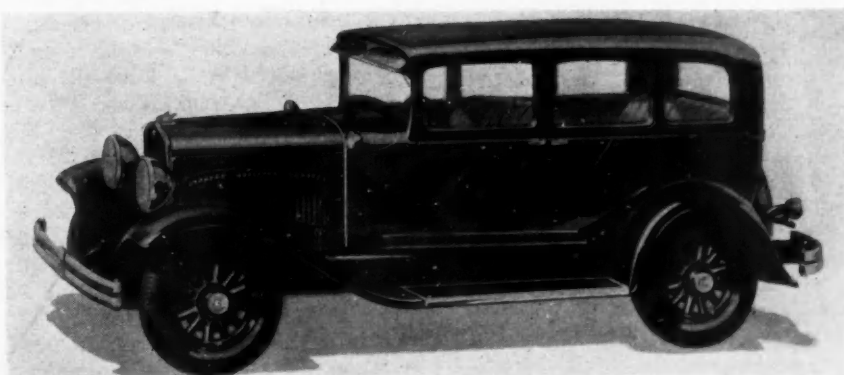
2-p. Business Coupe	\$795
2-4-p. Royal Coupe	835
2-4-p. Roadster	835
5-p. Touring	835
5-p. Four-door Sedan	845

Aside from the front end radiator shell treatment already mentioned, characteristic notes of the car are the chrome-plated nameplate attached to the front of the core, a fairly wide cheat molding at the base of the body side panels, and rather long and sweeping front fenders with a relatively short running board. Headlamp rims are chrome-



Center sectional view of the Chrysler Six engine, showing the inclined accessories drive shaft

The four-door Chrysler Six sedan (below), although the highest-priced standard model in the line, lists at only \$845. Steel construction predominates in the body



plated, and chrome-plated saddle bands and cowl lights are provided. Three-spoke steering wheels, water circulation thermostats, Delco-Remy-Lovejoy shock absorbers, automatic windshield wipers, coil type ignition locks, dash gasoline gage, rear traffic signals and rear view mirrors are included in the standard equipment.

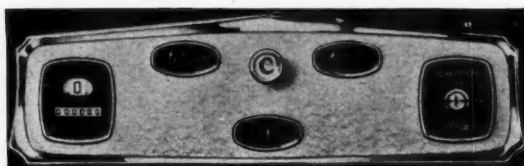
A new departure in engine design for Chrysler is found in the inclined accessories driveshaft, the distributor being located at the right and the oil pump externally at the left side of the engine. The distributor is automatic, and there is no external piping on the oil pump.

The bore and stroke of the engine are $3\frac{1}{8}$ and $4\frac{1}{4}$ in. respectively. Its four-bearing crankshaft is not counterweighted, but pistons are of the invar-strut aluminum-alloy type. High compression heads with a ratio of 6.2 to 1 are available at extra cost.

A rubber mounting described in *Automotive Industries* of Feb. 15 (page 224), is used at the rear of the engine. These mounts are a combination of soft and hard rubber, with metal binding plates, dimpled for stiffness, increasing the hold of the rubber to metal.

Piston rings are of the tongue-and-groove design used for some time past on Chrysler cars, there being three to the piston. Exhaust valves are of Silchrome, and inlet valves of chrome-nickel steel, with 1 5/16-in. valve ports. Valve tappets are guided directly in reamed holes in the cylinder block. Camshafts are of the four-bearing type, each with a bronze bushing at the front bearing.

Another deviation from Chrysler six-cylinder engine



The instrument panel on the Chrysler Six includes a coil-type ignition lock and dash gasoline gage in its equipment. There is no spark control, the distributor being of the automatic type

practice is found in the use of gears for the front-end drive, a non-metallic gear being mounted on the camshaft. Generator drive with this set-up is through the V-type fan belt, with the water pump driven in unit with the fan. The water pump itself is built into the front end of the cylinder block. Radiators are of the cellular type.

Chrysler Six clutches are of the 9-in. single-plate type with coil springs cushioning the drive torque between the driven plate and its hub. Transmissions are of the standard three-speed variety with oil-hardened chrome steel gears, and have the case mounted in unit with the engine according to normal practice.

Propeller shafts have two metal universals. Rear axle gears are of heat-treated nickel steel, with forged chrome-nickel steel axle shafts. Front axles have Elliott ends with Timken wheel bearings.

The frame side rail lower flanges are turned down for a considerable portion of the frame length for added rigidity. There are four cross-members and the engine is mounted at four points, rubber insulated.

Following usual Chrysler practice, service brakes are of the hydraulic type, internal expanding. They have 11-in. drums, and are supplemented by a propeller shaft parking brake.

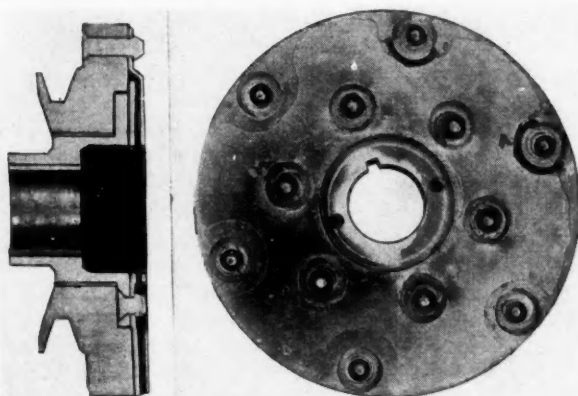
Other points of interest noted about the car are that the exhaust is carried down at the front of the engine to keep fumes and heat away from the body, that the Chrysler-type crankcase ventilating system is used, that shackles are of the metallic type, and that steering columns are adjustable.

Vibration Damper Design

A NEW idea in vibration damper design is to be found on the front end of the new Dodge eight crankshaft. As shown by the accompanying illustration it will be noted that it consists of a hub keyed to the crankshaft, a plate riveted to the hub flange, a rubber plate bonded to the hub plate, and also to another outer plate riveted to the fan pulley. The fan pulley itself rides on the hub on a bronze bushing, so that it may rotate relatively to the crankshaft. The only connection therefore between hub and pulley is through the rubber.

The physical characteristics of the rubber are said

to be proportioned so as to vary with the torque impulses of the crankshaft at the various harmonic speeds. There is no frictional element in the damper, with the exception of intergranular friction in the rubber itself. The fact that the rubber is bonded or vulcanized to hub and pulley plates respectively enables a design which can be expected to give fairly consistent results—much more so than if the rubber were distorted in the assembly process through some form of bolting or riveting.



Section and side view of Dodge torsional vibration damper

Supercharger Capacity

THE effect of changes in supercharger capacity on the performance of an airplane and its engine was investigated by the staff of the National Advisory Committee for Aeronautics at Langley Field, Va. The tests were conducted on a DH4-M2 airplane powered with a Liberty 12 engine. Four different supercharger capacities were tried, which were obtained by driving the Roots type supercharger (of 0.382 cu. ft. displacement per revolution) at 1.615, 1.957, 2.4 and 3 times engine speed, whereby sea level pressure was maintained to altitudes of 7000, 11,500, 17,000 and 22,000 ft. respectively. The performance of the airplane in climb and in level flight was determined for each of the four drive ratios and for the engine without supercharger. The power of the engine was measured during these tests by means of a calibrated propeller.

Compression Aids Vaporization of Engine Fuel

With an increase in pressure in the cylinder more heat is required to vaporize the fluid, but the heat generated by compression overbalances the difference.

By P. M. HELDT

WHEN a mixture of gasoline vapor and air is compressed in the engine cylinder, heat is generated, and this will help to vaporize any fuel that may be carried along in the liquid form. The heat of compression is therefore often depended upon to complete the vaporization process. One thing that is sometimes lost sight of in this connection is that as the pressure to which the mixture is subjected increases, it becomes more difficult to vaporize any remaining liquid fuel in it. The amount of heat required to vaporize a given quantity of gasoline increases with the gaseous pressure on its surface. Hence, compression both helps and hinders vaporization, and it is the object of this article to discuss the quantitative relations between these two effects.

Fuel chemists in recent years have devoted considerable attention to the dewpoint of combustible mixtures. The dewpoint is the lowest temperature of the mixture at which all of the fuel in it can be in the vaporized state. It is dependent upon the character of the fuel, the mixture proportion and, of course, the gaseous pressure of the mixture.

Data on dewpoints of mixtures of certain definite grades of gasoline were given in Scientific Paper No. 500 of the Bureau of Standards, by Roy J. Kennedy, issued some years ago. The dewpoint in general may be expressed by the equation

$$T = \frac{K_1}{\log P - \log \left(1 + \frac{M_f}{M_a} R_1 \right) - K_2}$$

in which

K_1 and K_2 are constants depending upon the characteristics of the fuel

M_f is the mean molecular weight of the fuel

M_a is the mean molecular weight of air

R_1 is the weight ratio of air to fuel in the mixture.

In tests made in connection with the preparation of the paper referred to the values of K_1 , K_2 and M_f were determined for various grades of fuel to correspond with mixture pressures P expressed in centimeters of mercury column and dewpoints T expressed in degrees Centigrade absolute.

For a certain grade of gasoline designed in the paper by the letter A, the value of K_1 is — 4550; of K_2 , 14.37 and of M_f , 121. The value of M_a , the mean molecular weight of air, is taken as 29.



Now let us assume that at the beginning of the compression stroke we have in the cylinder a mixture of 15 parts of air to 1 part of this gasoline, at a pressure corresponding to 68 cm. of mercury column (about 13 lb. p. sq. in. absolute). We will assume that this mixture is at its dewpoint. The equation given in the foregoing in conjunction with the data for the particular brand of gasoline enables us to determine the dewpoint of the mixture under these conditions. Substituting in the equation we get

$$\begin{aligned} T &= \frac{-4550}{\log 68 - \log \left(1 + \frac{121}{29} 15 \right) - 14.37} \\ &= \frac{-4550}{1.8325 - 1.8034 - 14.37} \\ &= \frac{4550}{14.34} = 317 \text{ deg. C. abs.} \\ &= 317 - 273 = 44 \text{ deg. C.} = 111 \text{ deg. F.} \end{aligned}$$

Hence at the beginning of the compression stroke the mixture is at an absolute pressure of 68 cm. of mercury column (13 lb. p. sq. in.) and at a temperature of 317 deg. C. absolute or 111 deg. Fahr.

If now we compress the mixture adiabatically in the ratio of 5 to 1 the pressure will increase in the ratio of $5^{1.41} = 9.68$ and the absolute temperature will increase in ratio $5^{0.41} = 1.93$. Hence the actual pressure at the end of the compression will be

$$9.68 \times 68 = 658 \text{ cm. of mercury column (127 lb. p. sq. in. abs.)}$$

and the temperature at the end of the compression

$$1.93 \times 317 = 612 \text{ deg. C.} \times \text{abs.} = 339 \text{ deg. C.} = 642 \text{ deg. F.}$$

In the engine, of course, compression does not proceed adiabatically but polytropically, as some of the heat generated by the compression is lost to the walls of the compression chamber. The result is that the pressure increases less rapidly than in adiabatic compression, approximately in the ratio $r^{1.32}$ instead of $r^{1.41}$, where r is the volumetric compression ratio. We can take account of this fact by assuming that compression in the engine

takes place in two stages, the first an instantaneous adiabatic compression, and this followed by a cooling period at constant volume, during which latter the absolute pressure and the absolute temperature decrease in the same proportion. The actual compression in the engine then will give the following end pressure:

$$5^{1.32} \times 68 = 8.37 \times 68 = 569 \text{ cm. of mercury column} \\ = 110 \text{ lb. p. sq. in. abs.}$$

The temperature of the mixture at this pressure will be
 $(569/658) \times 612 = 529 \text{ deg. C. abs.}$
 $= 256 \text{ deg. C.}$
 $= 493 \text{ deg. F.}$

The dewpoint of the gasoline under consideration at the pressure determined is

$$F = \frac{4550}{\log 569 - 1.8034 - 14.37} \\ = \frac{4550}{2.7551 - 1.8043 - 14.37} \\ = \frac{4550}{13.42} = 339 \text{ deg. C. abs.} \\ = 66 \text{ deg. C.} = 152 \text{ deg. F.}$$

Thus during the compression the dewpoint of the mixture is increased only from 111 to 152 deg. Fahr. while the temperature of the mixture is increased from 111 deg. to 493 deg. Fahr.

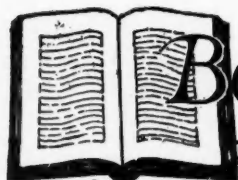
All of the above calculations are based on the use of a pure mixture of gasoline vapor and air. In the engine the mixture is contaminated with dead gases from the

previous cycle. The chief effect of these dead gases is to increase the weight proportion between the permanent gases and the fuel vapor, in the case of an engine with 5 to 1 compression ratio approximately in the proportion of 15 to 1 to 17 to 1. This would further lower the dewpoints both at the beginning and at the end of the compression stroke.

Since the heat required to vaporize all of the fuel in a theoretically correct mixture at atmospheric pressure will raise the temperature of the air in the mixture only 55 deg. Fahr. under constant volume conditions and only 40 deg. under constant pressure conditions it is seen that there is always plenty of heat generated by the compression to vaporize all of the fuel.

However, whether the fuel is completely vaporized depends also upon the time element. If some of the fuel should enter the combustion chamber in large globules, since the heat of compression is generated in the air and vaporized fuel, it can act only on the surface of these globules and it is conceivable that the time may not be sufficient to permit of complete vaporization of the globules, especially since, if the amount of heat present is only about just sufficient for vaporization, the temperature gradient and hence the rate of vaporization will become rather small toward the end. For this reason thorough atomization of the fuel is important.

Summarizing, it may be stated that while, under the conditions outlined and which are typical of engine operation under full load, the compression increases the heat necessary to vaporize the fuel in a theoretically correctly proportioned mixture by an amount equal to that required to raise the temperature of the air in the mixture 41 deg. Fahr., the compression results in the generation of heat to an amount which would raise the temperature of the air 382 deg. Fahr.



Books for the Business Bookshelf

Materials Handling Equipment

By Edward J. Tournier, McGraw-Hill Book Co., Inc. 371 pp. 146 illus.

THIS book presents a general survey of mechanical handling devices and describes specific applications of endless belt, chain and gravity conveyors, steam and water jet systems, pneumatic equipment, and the various types of industrial elevating and platform trucks. A section dealing with the selection, purchasing and evaluation of competitive bids is an interesting and useful feature. In closing, the author discusses briefly the economics of materials handling equipment and gives some of the accepted methods of figuring costs.

The Nature of the Physical World

By A. S. Eddington, The Macmillan Company, New York. 361 pp.

TEN Gifford lectures given by the author in 1927 at the University of Edinburgh form the nucleus of this presentation of the fundamental theories and philosophy underlying modern scientific thought. To the man who has been away from his classical physics for some time, this book offers a stimulus to learn something more about the startling changes in the scientific world that have come about in the last few years. Prof. Eddington gives in non-technical fashion an explanation of the quantum theory and the new quantum theory

governing atomic action. Among other things are a discussion of the Einstein theories of relativity and a conception of four-dimensional space with Time as the fourth dimension. The Fitz Gerald Contraction, the property of all matter of shrinking in length under the influence of high velocities, is sketched realistically on the basis of the electronic structure of atoms. The book closes with an excursion into the realm of the mystic and supernatural in the light of our new knowledge.

Airplane Mechanics Rigging Handbook

By Rutherford S. Hartz and Elzor E. Hall, New York. The Ronald Press Co. 1930. 265 pp. \$3.50.

THE rigging maintenance, inspection and repair of airplanes are covered rather fully in this book, which is designed as a handbook for licensed airplane mechanics, or as a textbook for use in ground schools. The latter use is facilitated by the interposition of numerous questions at the end of each chapter, covering the material contained. Instructions of a practical nature are illustrated with numerous photographs and diagrams. A whole section is devoted to the care and packing of the two types of parachutes in most common use. Much information is given about the several useful arts with which the airplane rigger must be familiar, such as wood steaming and bending, the construction of jigs, the properties of wire, and the properties of dopes, fabrics and glues.

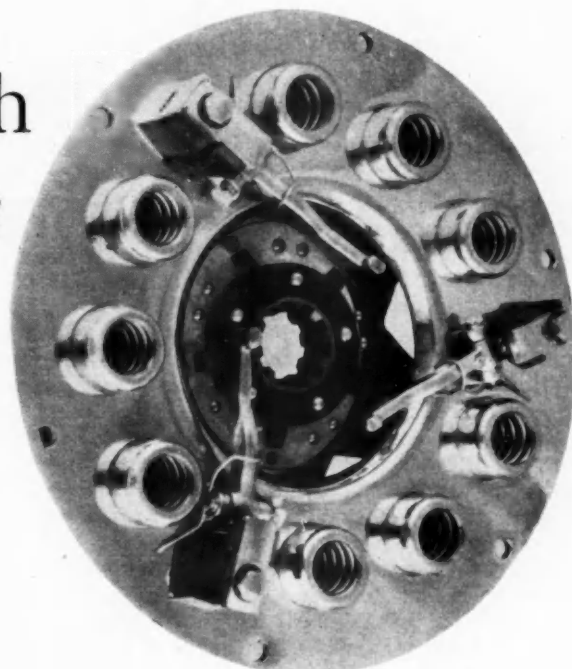
Russell Tower Clutch *Embodies New Design*

Engaging motion of pressure plate mechanically retarded or graduated so that unit does not grab.

A NEW design of single-plate clutch, known as the Russell "Tower" clutch, has been placed on the market by the Russell Manufacturing Company of Middletown, Conn., and will be manufactured for it by the Spicer Manufacturing Company of Toledo, Ohio, except for the special fabricated, spider-type driven member used, which will be made at Middletown by the Russell Company. The clutch will be produced in both single-plate and twin-plate types, the single-plate type in three sizes, 9, 10 and 12 in. diam., and the twin-plate type in two sizes, of 9, and 10 in. diam.

The feature of the clutch is that the engaging motion of the pressure plate is mechanically retarded or graduated, so that the clutch does not grab. This is accomplished through the use of a variable leverage control which is exclusive with this design.

The driven member comprises a drop-forged and heat-treated hub and companion flange, internally splined in accordance with the usual practice. The spider-type driven member is equipped with a new mechanical damper. In the following the driven member will be described, as the type best adapted for modern automotive installation in connection with multi-cylinder engines. There are five independent spokes, stamped from sheet steel, which are riveted between two annular flexible disks of sheet steel. The spoke-and-disk assembly drives the hub through five packs of leaf springs, acting as yieldable keys. These packs are

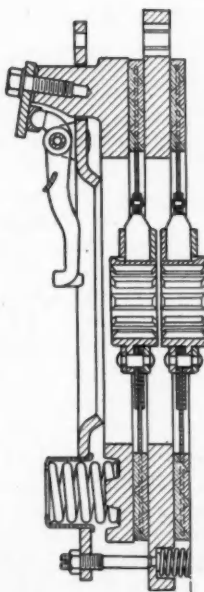
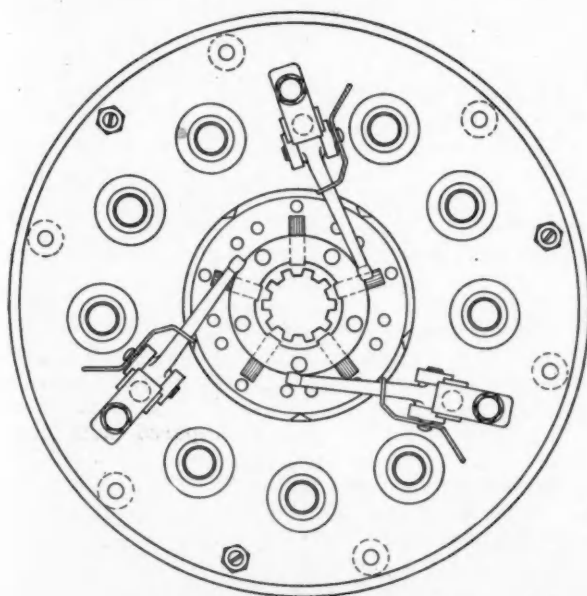


The Russell "Tower" clutch

so located and harnessed that, whether power is being transmitted through the clutch from the engine or in the opposite direction, the springs are being flexed, and their flexing, controlled by generated curves on the holding members of the assembly and assisted by inter-leaf friction, serves to damp out any torsional vibration that is set up.

The fabricated driven member is provided with an improved clutch facing in either the molded or the woven type, both of the Russell Company's manufacture. The outer ends of the spokes are embedded in the "facing," no rivets being employed to fasten the rings of friction material to the separate spokes. The facings are processed after assembly with the fabricated spider and then ground on both sides to a tolerance of 0.002 in. as regards parallelism. It is claimed that when the spider is mounted on the hub, either with or without the mechanical vibration damper, the resulting driven member runs true without very close tolerances.

In addition to the fabricated driven member the clutch proper comprises a unit made up of a master plate and a pressure plate. The master plate is piloted concentric to the flywheel by means of a turned snap pilot secured by either studs or screws. It carries the drawn-steel spring retainers, lever-mountings and levers. The driving and release lugs of the pressure plate telescope through finished rectangular slots in the master plate, all of these telescoping bearing surfaces being lubricated automatically by means which are not affected by heat. The actuating levers are used to control the release and govern the engagement of the clutch in operation. Either six or nine coiled springs are used, and are located on different radii to insure equal load distribution on the pressure plate, in either two or three spring clusters between each pair of adjacent levers. The levers are fulcrumed on



Side view and cross-section of the Tower clutch

separate stamped brackets tanged and riveted into the master plate, and oscillate on hollow hardened floating pins.

The outer end of each lever is provided with a finished and hardened ball end on which a spherical-seated self-lubricating rider block is mounted and retained, the upper bearing surface of which is flat and rectangular in shape, with guiding flanges on two sides which engage the rider block caps attached to the inclined top surface of the three pressure plate release lugs. This combination provides the variable leverage control of the pressure plate and permits the use of a driven member assembly that is entirely flat and continuously in contact over the entire area of its facing. This eliminates the need for inherent distortion in the driven member assembly, against which it is urged that it would require additional spring load to overcome. Further, owing to the use of this flat driven member, a considerable less release range is required, which in turn permits the use of a greater leverage ratio and results in a low pedal pressure.

Wear on the friction facing of the clutch and on the Sabeco metal blocks have compensatory effects. Exhaustive tests are said to have shown that the amount of wear on the facing is about equal to the wear on the blocks, hence the adjustment is not materially changed during the life of the facing material. However, adjustment can be made by the use of shims. An axial motion of about 0.012 in. is sufficient to give complete release for shifting. The driven member and facing assembly being entirely flat, no excessive pedal pressure is required for complete release for shifting. For passenger car installation a pedal pressure of only about 16 to 20 lb. can be obtained.

The hollow fulcrum pins are provided with a wicking saturated under pressure with a heat-resisting oil when

the clutch is assembled, and the drilled holes below the tension screw are loaded with a suitable dry lubricant automatically conducted by centrifugal force to the bearing surfaces of the telescoping members as lubrication is required. These features, together with the bleeding and self-lubricating qualities of the rider block as described, result in a clutch unit having a self-contained lubricating system.

The majority of the parts, including levers, springs, cages, rider blocks and anti-rattle springs, are interchangeable throughout the whole line, and only the master plates and pressure plates vary in diameter. A feature of the grid type pressure plate is that it is circularly and tangentially ribbed on the back, which adds to its rigidity and cooling area, and is said to prevent permanent distortion during cooling, if subjected to excessive heat. This pressure plate is made of nickel alloy cast iron.

In the design of this clutch a product was aimed at which would be compact, easy to install, operate or service. The finished clutch units are shipped from the factory with assembly blocks inserted under the ends of the rider block caps adjacent to the driving and release lugs, which relieve the rider blocks and lever ball end of the spring pressure during shipment. This makes it easy to assemble the clutch to the flywheel. As soon as the retaining cap screws holding the master plate to the flywheel are screwed home, the assembly blocks become released and drop out, releasing the total spring load to the driver member assembly. The entire clutch can be readily removed or disassembled in pieces from the powerplant by merely unscrewing first the three cap screws holding the rider block caps in place and then further backing off the six nuts or cap screws used for securing the master plate assembly to the flywheel.

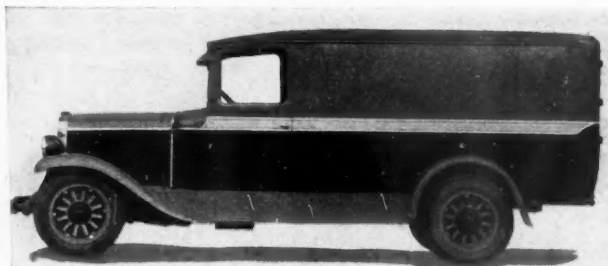
Mack Light Delivery Truck

A NEW six-cylinder truck for fast, light-load service, known as the Mack Model BL, has been added to the line of Mack Trucks, Inc. The truck has a wheelbase of 148 in. and is equipped with a six-cylinder engine of 3 1/4 in. bore by 5 in. stroke delivering 53 hp. at 2300 r.p.m. The engine is similar in design to previous Mack engines. A multiple-disk dry clutch and a four-speed transmission are combined with the engine. The rear axle is of the full-floating, spiral-bevel-gear-drive type, and four different reduction ratios are offered, viz., 4.86, 5.17, 5.83 and 6.80.

The frame has side rails of heat-treated alloy steel 7 in. deep at the middle, with tubular and channel-type cross members. All springs are of the half-elliptic type, hinged at one end and mounted in rubber shock insulators at the other. Four-wheel internal hydraulic service brakes are fitted, together with a mechanically operated emergency brake on the propeller shaft. Wood-spoke wheels are fitted with 6-in. tires on 20-in. rims, single in front and dual in rear.

A Mack-built, coupe-type fully inclosed cab is furnished and is distinguished by a wide door and unusual headroom. Ignition is by a battery system with semi-automatic advance, and a six-volt starting and lighting equipment are furnished. Other items of equipment include an electric gasoline gage, electric horn, headlamps with dimmer control, a tire carrier, front bumper, dash thermometer, Electrolock switch, tools, jack and windshield wiper.

The Model BL is offered with four standard body



Mack BL 1-ton truck chassis with panel body

types. The weight of the chassis with panel body is 4765 lb. of which 53 per cent is on the front and 47 per cent on the rear axle.

BAKING practice for oil-sand foundry cores is discussed in a bulletin of the Department of Engineering Research, University of Michigan, the author being H. L. Campbell, associate professor of shop practice. The cores referred to are prepared with raw linseed oil. This oil dries by taking up air and oxidizing. The oxidation process is promoted by heat, and its rate is greatly increased between 350 and 450 deg. Fahr., while heat beyond 500 deg. Fahr. destroys the oil.

Copies of the bulletin can be obtained from the University of Michigan at 50 cents each.

Economic Problems in Distribution Confront Major Industries

Effective marketing has not kept pace with the strides in the design of equipment and increased production of the last five years, American Management Association is told.

EFFECTIVE market research, closer communion with the buyer of industrial products and product psychoanalysis were pointed out as methods of solving the problems of distribution confronting American industry today at the Industrial Marketing Conference of the American Management Association at the Blackstone Hotel, Chicago, March 5 and 6. The important part that is, or should be, played by the salesman in the marketing scheme of things was emphasized also in the talks and discussions which followed. Optimism regarding the business outlook for the current year was apparent in the discussions, although the seriousness of the economic situation in the last few months was not minimized. Industrial go-getters will come through successfully in spite of adverse conditions seemed to be the consensus.

While industry has made tremendous strides during the last five years in the design of equipment, the more economic use of materials and material increase in production per square foot of floor space, it has not made similar advances in the effectiveness or efficiency of distribution, the conference was told by E. O. Shreve, assistant vice-president of the General Electric Company. He offered this statement not as a criticism of industry, but rather as an indication that conditions have changed very materially, making it necessary to find the answer in more scientific distribu-

tion methods and consequent lower distribution costs.

"We have had at least 150 years of experience in design and manufacture from which to draw in increasing the efficiency of operation in these departments," Mr. Shreve declared, "but comparatively recently—perhaps 25 years ago—the main problem presented to industry changed from one of production to one of distribution.

"Economics is the chief factor in determining channels of distribution," he said, "and industry should work from the customer to the factory. Once the economics of the problem are realized, it will be a comparatively easy thing to outline distribution channels that will get the best results with the least expenditure of money.

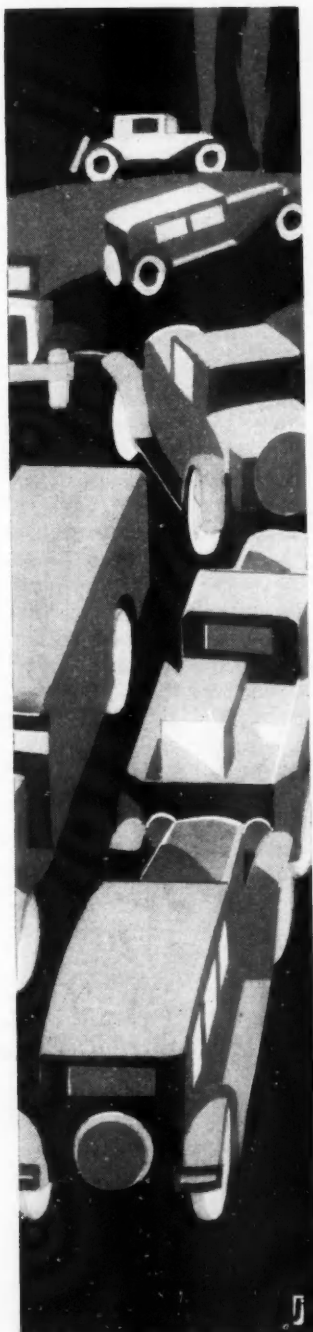
"The basis of determining these channels rests on a market survey and a uniform method of listing customers with necessary information for sales guidance and a careful classification of customers, so tabulated as to give almost automatically the course of treatment."

American industry has entered a new era, Mr. Shreve maintained, and while much constructive work has already been done, much more still remains to be done. "We have been shooting too long with a shotgun with faith that we may hit something in the way of business," he said, "but we must now arrange our program so that we know where our customers are and discard the shotgun for a rifle that corresponds to economic channels of distribution with a target—business—which is fully visible."

This year industry will shake many lemons from the tree, and the culled tree will stand the blow and produce even larger juicier fruit than before. That was the prediction of Edward J. Mehren, vice-president of the McGraw-Hill Publishing Company, who cited the buyer as the agency from which the manufacturer with red ink or falling sales in his merchandising picture can learn the path to successful sales.

"Everything in successful marketing today focuses on the product," Mr. Mehren said. "All of the 'back of the product' insurance of plant personnel and production goes for naught if the product be not possessed of today's features. These features are the elements in a product that have been created not on the basis of the manufacturer and the producer alone, but by those factors operating with the greatest possible knowledge of the user's needs."

"The day of inclusion of the sales department's contribution to product de-



Advertising Appeal

THE very appeals in advertising which make the engineer, technician, superintendent and architect want clothing, food, radio or automobiles are being used by the industrial advertiser of today to make this same buyer want machine tools, motors, lubricants and a thousand and one other things required to run a business, according to Forrest U. Webster, advertising manager of Cutler-Hammer, Inc. Mr. Webster outlined the industrial advertising trends before the American Management Association convention in Chicago last week.

velopment work is here more definitely than ever before," Mr. Mehren said. "The competition of today outstrips the salesman of the cloistered product, and the tool of research stands ready to relieve these overburdened sales forces. Apparently this same trend has arrived in other fields than industrial marketing. It is a broad trend in all business.

Products and Sales Analysis

"Construction may be pushed, agriculture may be relieved, and mining may be helped, but the manufacturing industry of America can help itself. Overproduction is too easy with an obsolete product, and overproduction is the result, not the cause, in many a case. One contribution to the movement instituted by President Hoover on behalf of American business that might well come from the group of industries classed as manufacturing would be a concerted movement for product 'psychoanalysis.' Around the corner in industrial marketing there lies intensive study of products and lines from the customer's angle, supplemented by resulting developments in marketing, sales cost accounting, sales control and sales promotion analysis."

Walter Emery, director of commercial research for the United States Rubber Company, explained in detail the functions of industrial marketing research in calculating the potential market for a material or commodity by territories, by industries or by customers, whether sold direct or through branches or jobbers. The first step in a marketing research program, he said, is the detailed analysis of the actual sales, to indicate the trend of sales in the various branch or jobbing areas and in the various industries. A breakdown of sales by branches, by jobbers, by salesmen, by customers will often disclose a weakness in selling methods, he pointed out, thus disclosing the good and the bad factors in present-day selling methods.

C. R. Cary, vice-president in charge of sales of the Leeds & Northrup Company, in calling attention to the manifold duties and responsibilities of the salesman, held that there are many services performed by an industrial equipment salesman which cannot be measured by the usual expedient of the number of orders he brings brings in.

"The salesman is handling a high-priced unit which has a long life expectancy," he said. "The unit may be, and should be, altered at this or at that point to adapt it to each customer's needs; it may need this or that addition to enable it to function to best advantage for the various applications. Even worse than this, there may easily be causes where the equipment in none of its form should be sold, even though to a superficial ob-

server any of them might appear suitable. If a mistake is made in the recommendations it may not become apparent for a long time after the event, and the responsibility has then become difficult to place. Under such circumstances a salesman may readily show a fine sales volume over a very considerable period before anything in that sales volume will give any clue to the fact that he is leaving behind him a trail of dissatisfied customers who will plague that organization for years to come."

Sales Bonus Plan

Mr. Cary explained the sales bonus plan of the Leeds & Northrup Company, which is based upon the total service of a salesman to the company, rather than upon his total volume of sales. The sales bonus is dependent upon the profits earned by the company during the year. In deciding what proportion of the total amount comprising the sales bonus fund is due to any salesman the company considers the salesman's judgment, cooperativeness, experience, technical skill, executive ability, length of service, etc. The results of the examination of the salesman's total worth are expressed as a percentage of the sales bonus fund which is to be distributed at the end of the following year.

James L. Palmer, professor of marketing at the University of Chicago, also laid special emphasis upon the importance of a capable, intelligent, carefully supervised sales force. No industrial sales organization can be brought under control, he said, unless salesmen are carefully selected and thoroughly trained; unless effective incentives are brought to bear upon the sales force; unless performance standards are established; unless the working plans and methods of salesmen are specified in advance; unless salesmen's work is methodically subjected to periodic inspection, and unless this work is carefully appraised through the use of records which reveal every significant fact about it. The omission of any one of these activities weakens any plan of control, Professor Palmer said, but if each is effectively developed in the management of a field selling organization, it will have been brought under as close a control as can be achieved. Effective supervision of a sales organization, he added, involves simply the full utilization of all the practical instruments of control. Every sales executive, he pointed out, has a problem in selecting these instruments and so shaping them as to best suit his individual needs, and exhaustive study of the requirements of the individual company and of the problem of shaping the instruments of supervision to meet these requirements alone will result in effective control.

Forrest U. Webster, advertising manager of Cutler-Hammer, Inc., called attention to the fact that the outstanding trend now taking place in industrial advertising is that these advertisers are following the methods of sales promotion, publication and direct mail advertising used by general advertisers.

Advertising Appeal General

According to Mr. Webster, the industrial advertiser has found his much-worshipped engineer, technical man, superintendent, architect, or what not, is first of all a human being. He has found the appeals which the general advertiser uses to make the industrial buyer want clothing, food, radio or automobiles are the very appeals which make him want machine tools, lubricating oils, motors and the other thousand and one necessities required to run a business.

"Industrial advertisers are finding it necessary to employ better personnel in their marketing departments," Mr. Webster said. "In the past few years they

have found while it is easy to make most any quantity of anything, the big job is to sell it. It takes real organizers, real salesmen, real managers to sell in the competitive markets of industry as they exist today."

Mr. Webster cautioned the industrial advertiser against using the media of mass circulation before he has first used the business and technical papers reaching his public. The advertiser must build on the sound foundation of the technical paper and direct mail advertising, he maintained, else his advertising in the general media can make the entire structure top-heavy.

John G. Thompson, assistant to the president of the Simonds Saw & Steel Company, explained how, since the World War, major movements in money rates reversed have forecast major movements of industrial production or of the volume of manufacture, with the result that his company since the war has been able to forecast correctly many months in advance every major fluctuation in its sales.

Major Fluctuations Forecast

"This also means that every major fluctuation in total industrial production in the United States has been forecast many months in advance, and that thus the sales of organizations that derive their sales from industrial production have been correctly forecast," he told the conference. "These forecasts are not post facto forecasts, but have in each case been made and published before the event. There have been four upward major movements. We are now in the fourth downward movement. Money rates have been falling off since November, 1929, and have been for five months forecasting the next major upward movement in business to begin some time in the latter half of 1930 and to continue to the next cyclical peak in 1932—if the movement of business in short cycles continues as it has since the war. We are now at the end of the fourth short cycle, each of about three years in length. It is possible, of course, that this movement in short cycles will not continue indefinitely. From 1872 to 1914, in a period of 42 years, there were 14 short cycles averaging about three years in length. As we have said, since the war there have already been four."

Dr. Robert J. McFall, editor of the Survey of Current Business and chief statistician for distribution, Bureau of Census, Department of Commerce, told the delegates that the national bookkeeping system which has been applied to production for many years is being improved in this present decennial census and is being extended to cover also the facilities which market or distribute the products. During the past decade, according to Dr. McFall, the demand has been growing to extend the scope of the census to include distribution as well as production.

Revise Manufactures Census

The new developments, he explained, involve including the operations of every retailer, wholesaler and other distributors in the scope of the census; revising and improving the plans for the census of manufactures and mines, including therein the distribution operations of these establishments, and extending the scope of the census to include the operations of automobiles and automobile accessories in general, all hotels having 25 rooms or more and all construction contractors doing a business of \$25,000 a year or more.

The program of the manufactures census has been thoroughly revised by a committee of business men appointed by the Secretary of Commerce for this purpose, and another committee of business leaders has advised regarding the development of the plans for the

Business Upturn Due

"*THERE have been four major upward movements (in business) since the world war,*" John G. Thompson, of the Simonds Saw & Steel Co., told the delegates to the American Management Association meeting. "We are now in the fourth downward movement. Money rates have been declining since November, 1929, and have been forecasting the next major upward movement to begin some time in the last half of 1930, and to continue to the next cyclical peak in 1932—if the movement of business continues in short cycles as it has since the war."

census of distribution. As the result of the efforts of these two committees, a very large body of information is being collected to show the utilization of leading materials by all the leading industries.

WASTE ELIMINATION STRESSED

(Continued from page 432)

"We now come to the point of disposing of them, and in our endeavor to find out what is recoverable, we must eliminate certain items, such as

Labor	25
Materials (foundations)	5
Materials (freight)	10
Materials (vendor's profit)	16
(estimated as an average)	

56%

"This then leaves about 44 per cent of the original cost, recoverable either at an expense or profit, and in explanation, let me state that some buildings and plants are disposed of by having the salvage equal to expense; others, cost money plus available salvaged materials; while others show a profit."

To illustrate the application of these figures, Mr. Phillips gave a detailed study of seven types of plants which had been disposed of and then averaged the results as follows:

"Plants, buildings, apparatus and equipment, valued at \$2,484,000, have been disposed of for \$80,550, or a little more than 3 per cent return. If, however, we consider that there is only 44 per cent recoverable material, as pointed out in the foregoing, then we have \$1,092,960, sold for \$80,550, or about 7½ per cent.

"The capital investment account has been relieved of a dead item on which to make an earning; taxes and other expenses incident to maintaining obsolete buildings and idle plants have been eliminated, and the money put to work in other useful channels.

"Over a period of six years, our machinery and equipment sales have shown an average return of about 50 per cent of book value, and if apparatus and equipment are on an average 65 per cent of the total original cost as shown in the table of percentages, these sales then show about 32½ per cent of the disposal return, and indicate that the other items have shown a loss of 29½ per cent, as the net return on the book value is given at about 3 per cent.

"These figures are not given as a guide, but are presented as our experience over a period of years."

Average Annual Car Mileage Increased Considerably in Five Years

Fuel economies brought about by more efficient engines and better roads counteracted by higher road speeds, greater acceleration and waste of fuel in traffic congested areas.

MOST automobile owners whose experience as such dates back more than a decade are conscious of the fact that the average driver piles up a considerably higher mileage in the course of the year now than he did, say, 10 years ago. Statistics of automobile production and registration lead to the conclusion that the life of automobiles expressed in years has constantly increased, and since the average car now travels farther per year it is obvious that the life expressed in miles has increased even more.

That cars are being used more now than formerly is due to many causes. There is, first of all, the improvement of roads. This has promoted increased use of cars in several ways. It has permitted of much higher average speeds, so that greater mileages can be covered in the same time. By increasing the mileage which can be covered in a single day it has tended to encourage the use of vehicles for longer trips, for which the railways would be used otherwise, or which would not be made at all. The improved roads reduced the wear and tear on the vehicle, thus making its use more attractive from an economic standpoint. The replacement of open by closed types of vehicle encouraged the use of cars throughout the year, doing away with the previous practice of many owners of putting their cars in storage during the winter, and the introduction of systems for keeping main highways free of snow in winter time has tended toward the same end. Finally it seems logical to assume that the constant improvements in design with the object of making vehicles more comfortable also have had the effect of boosting the average annual mileage.

The best index we have as to the increase in the use of cars is the average consumption of gasoline per car per year, regarding which definite figures are available—for the earlier period only on the basis of the total consumption of gasoline in the country, while for recent years also on the amounts of gasoline used in the different states for the propulsion of road vehicles, on which a gasoline tax is being paid. Except for the period of depression following the post-war boom, there has been a constant increase in the amount of gasoline consumed per car and per year. Of course, the fact that

the average car consumed 40 per cent more gasoline in 1928 than in 1923 does not warrant us in concluding directly that the average car mileage was 40 per cent greater in 1928 than in 1923. Another factor that enters into the problem is the average mileage per gallon which may also have changed during this period.

Designers of automobile engines and all those working on the improvement of carburetors, vaporizing and distribution systems undoubtedly have worked, and successfully, to improve the thermal efficiency of the engines. Higher compression ratios are now generally used, which lead to higher fuel economy. Manifold systems have been gradually improved to assure more nearly uniform distribution of the combustible mixture. This also tends to improve the economy, because if, owing to defective design of the manifold, one cylinder receives a materially leaner mixture than the rest, the mixture as a whole must be enriched to cause the one cylinder to do its share of the work, with a consequent waste of fuel. The provision of such devices as accelerator wells or pumps and of economizers on carburetors further has made it possible to generate 1 hp.-hr. with a smaller quantity of fuel.

Aside from improvement in the design of engines and accessories the chief factor tending toward increased fuel economy is the improvement in roads. With one and the same car driven at the same speed the fuel consumption is the less the harder and smoother the road surface and the less, therefore, the coefficient of rolling resistance.

These two changes which should have brought about an increase in the mileage per gallon of gasoline are offset by at least three changes with a contrary tendency. The first of these is due to the fact that constantly more emphasis has been placed in recent years on "performance." High acceleration is valued by purchasers almost above everything else, and this has led to the powering of both passenger cars and commercial vehicles with engines of comparatively large displacement and—in the case of passenger vehicles at least—to the use of large rear axle reductions and small-diameter road wheels. The net results are that at any given speed there is more surplus power available for

Gasoline Consumption Trend

Year	Per Vehicle Gallons
1918	453
1919	434
1920	408
1921	405
1922	411
1923	411
1924	441
1925	473
1926	528
1927	572
1928	587
1929	(Est.) 642

Gasoline consumption per year per motor vehicle in U. S. for both cars and trucks.

acceleration and when not accelerating the engine operates at a smaller proportion of its maximum torque than formerly. In other words, the average load factor is less, and the engine operates at a smaller relative throttle opening—always for the same road speed.

However, road speeds are no longer the same. The increased average road speed already was pointed to in the foregoing as one of the factors contributing to the increase in the average annual mileage. Higher average road speeds are being maintained wherever traffic condition permit of it. Now, the road speed at which the fuel consumption per mile is at the minimum is comparatively low—of the order of 30 m.p.h. This is due to the fact that the power required to move the car increases with the road speed. If this were the only factor then the road speed corresponding to minimum fuel consumption should be the minimum possible driving speed, but another factor also enters into the problem, namely, that of engine efficiency. As the road speed is increased from the minimum the resistance to motion increases, but the thermal efficiency of the engine increases at the same time, and up to about 30 m.p.h. this latter is the controlling factor. Above 30 m.p.h. the air resistance increases so rapidly that it is no longer compensated for by the increase in engine efficiency.

Consumption Increases

Much of the traveling on country roads is now done at speeds of 50 m.p.h. and over, at which the fuel consumption per mile is considerably above the minimum. Whatever gain there has been in the average speed of country-road travel in recent years therefore has tended to decrease the average mileage per gallon.

Congestion of traffic in large centers of population is an important cause of fuel waste, which undoubtedly has increased in recent years in spite of efforts to improve traffic conditions. Such conditions, moreover, are not limited to the large cities, but are encountered even in the smaller places, especially in the older sections of the country where streets are narrow, and on Sundays and holidays long lines of vehicles often form ahead of important road crossings and advance for long periods by about a car length at a time. These conditions are becoming aggravated with the increase in the number of cars registered in spite of the building of new roads and the widening of streets as in lower New York at the present time.

Realized Mileage Unchanged

It is impossible to accurately balance these favorable and unfavorable influences on the mileage per gallon. The best possible mileage of most cars, no doubt, has increased, but it is very doubtful whether there has been any change worth speaking about in the actually realized mileage under average operating conditions. If this is so, then the increase in the fuel consumption per car per year is a direct measure of the increase in average car mileage per year.

In the accompanying table are given the quantities of gasoline per car consumed in the country during each year from 1918 to 1929, the figure for the last year being based partly on estimates. It will be seen that from 1918 to 1921 there was a decrease, and the reasons for this are, no doubt, closely bound up with the rapid changes in industrial activity and economic conditions during and immediately following the war. That a serious depression like that of 1921 should noticeably affect the degree of use of the average car is to be expected.

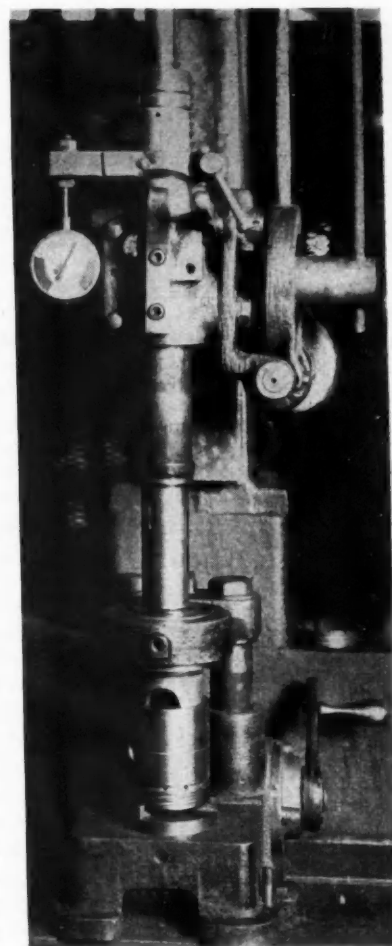
If we want to eliminate the effect of changes in the economic conditions of the country on the average an-

nual mileage, we can probably do no better than to take the figures for the years 1919 and 1928, as both of these years preceded years during which a marked slump occurred and may, therefore, be considered as occupying corresponding positions on the curve of business cycles. From 1919 to 1928 the average annual increase in the amount of gasoline consumed per car per year was 3.4 per cent; from 1920 to 1928 it was 4.6 per cent.

Weighing Viking Pistons

AN excellent example of the coordination of an inspection and production operation is the process by which Viking pistons are finished to a uniform weight within a maximum tolerance of 1/16 oz. Weighing and trimming to standard weight is done by one operator on a standard machine.

The finished piston is weighed and the excess weight in fractions of an ounce is carefully noted (underweight is cause for rejection). The piston is then placed in the small drill press shown, and excess weight is automatically removed from a small internal boss. The outstanding feature of this operation is a micrometer gage which controls the downward stroke of the drill press head. The face of this gage is divided into five segments, each of which represents 1/16 oz. To remove excess weight the operator starts the drill press and then stops it when the desired reading on the micrometer gage has been reached.



Drill press gage used to check weight of Viking pistons

THE S. S. White Dental Mfg. Co., Industrial Division, New York, N. Y., has issued a flexible Shaft Handbook. This is a treatise on the general subject of flexible shafts with particular reference to the various types of these shafts made by the S. S. White Dental Manufacturing Co. In automotive work these shafts are used for driving the speedometers, tachometers on aircraft engines, for spotlight controls, and for governor drives on commercial vehicle engines.

It is pointed out that a flexible shaft should offer maximum resistance to twisting loads combined with minimum resistance to bending and at the same time have as little internal friction as possible.

The practical limit to the size of flexible shafts is said to be 3/4-in. diameter.

Plymouth Distribution Extended to Affiliated Chrysler Lines

*Lowest priced unit of corporation to be handled jointly by
De Soto, Dodge and Chrysler car dealers, in addi-
tion to their own. Advertising co-ordinated.*

WITH the announcement by Walter P. Chrysler of drastic price reductions on the Plymouth line, and the simultaneous acquisition of this line by Chrysler, Dodge and De Soto dealers throughout the country, come the details of a new merchandising plan that has many unique and novel features.



A. vanDerZee, gen-
eral sales manager,
Plymouth Motor
Corp.

Behind the move are two important considerations. First, the desire of Chrysler Motors to enter the lowest priced field on a strongly competitive basis with volume production; and second, to improve the position of all dealers affiliated with the Chrysler Corp. through the addition of the Plymouth car at new low prices to their established Chrysler, Dodge or De Soto lines.

With this move, the strictly Plymouth dealers as such are being absorbed by other divisions of the Chrysler Corp., and will thereby benefit through the opportunity of selling,

in addition to the Plymouth car, one of the other Chrysler Motors lines. In making the car available to all distributors and dealers in the Chrysler Motors organization, the sales agreements are made with that branch of the corporation with which the dealer already has a contract. These sales agreements, in the case of the Chrysler distributing organization, are made between the Chrysler Sales Corp. and its distributors and in the case of De Soto and Dodge, the contracts affected are those between these companies and their direct dealers.

In these sales agreements no definite quota requirements are specified. A dealer or distributor does not have to take so many Plymouths for so many Dodge, De Soto or Chrysler cars, but places monthly shipping orders for the number of Plymouths he requires through either the Dodge, De Soto or Chrysler sales organization—whichever line of cars he is handling. The function of the sales organization of the Plymouth Motor Corp. is therefore now of a supervisory nature, correlating the activities in the lowest priced field of all the distributing branches of the Chrysler

Corp. Plymouth sales will be accelerated by an extensive advertising and merchandising campaign under factory direction, at no additional cost to the dealer.

The new method of distribution on the Plymouth car will also apply to the distribution of Plymouth parts, the dealer securing his parts requirements through the sales division with which he is connected. This arrangement, together with centralized supervision and the coordination of the service departments of the Chrysler, Dodge and De Soto divisions, assures the dealer selling Plymouth cars readily available parts and maintenance cooperation, as well as the advantages of thorough technical Plymouth service training through the Chrysler Motor Service School.

The new distribution plan has no bearing whatever upon the methods of distribution now in effect with the Chrysler, Dodge and De Soto lines, according to A. vanDerZee, Plymouth general sales manager.

"Evidence of dealer satisfaction is widespread and consistent, Mr. vanDerZee said. "Numerous messages showing the enthusiastic reception of the new plan by dealers throughout all parts of the country have been pouring into the Plymouth factory offices in the past several days and Plymouth production schedules are being increased materially. The situation, briefly, from the standpoint of the Chrysler or Dodge or De Soto dealer, is that the dealer has a big sales advantage in being able to supplement his present established line with the full-size Plymouth at its new low prices."

Price Competition

NEW prices place the Plymouth, a four-cylinder model, in favorable competitive position with Ford, a four-cylinder model, and Chevrolet, a six-cylinder model, and with expanding selling outlets should broaden the market for Chrysler's lowest priced line.

In the following table, Ford, Chevrolet and Plymouth prices on leading models are compared:

Model	Ford	Chevrolet	Plymouth
Two-passenger coupe ..	\$500	\$565	\$590
Five-passenger coach ..	500	565	610
Five-passenger touring .	440	495	625
Five-passenger sedan ..	600	675	625

Entire Surfaces Tested for Hardness by Cloudburst Instruments

Measuring devices show location of "soft spots" by means of a "curtain" of steel balls dropped on material under inspection.

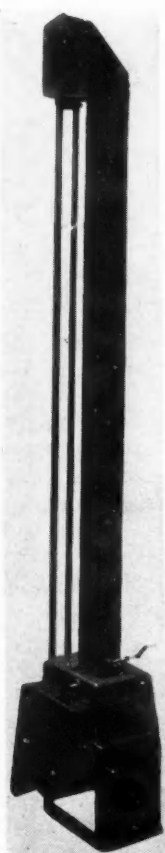


Fig. 1—Motor-operated Cloudburst hardness testing machine

ONE deficiency of ordinary hardness measuring instruments, from the standpoint of inspection of production articles, is that they determine the hardness at only one, or at most a few points of the surface of the article. Theoretically the hardness is the same over the entire surface, which presumably has received the same treatment, but it is well known that in the practice of case-hardening, for instance, so-called "soft spots" are a common fault. It is therefore obvious that in work where uniform hardness is essential it is very desirable to check the entire surface for hardness.

A method which permits of doing this in a commercial way has been worked out by Edward G. Herbert, a

British engineer, and is known as the Herbert cloudburst method. In this a very large number of small hardened steel balls are allowed to drop onto the surface to be tested from a height depending upon the hardness of the article. The height of fall is so chosen that if the article under test is of the proper hardness the balls do not produce any marks on it, whereas if it is of insufficient hardness such marks will be produced. The Herbert Cloudburst machine is being sold in this country by the Tinius Olsen Testing Machine Co. of Philadelphia.

The machine is made in two types, one motor-operated and the other hand-operated, the general principle of operation being the same for both. It may be pointed out here that the "cloudburst" method of hardness testing is a non-destructive method for those parts which are of the proper hardness.

In the motor-driven machine (Fig. 1) 250,000 steel balls of $\frac{1}{8}$ in. diameter are used. By means of a chain elevator these are raised to a height of 4 meters (13.12 ft.), and they are then allowed to fall through a flat tube until checked by a piston which serves as a diaphragm. The piston is movable up and down inside of the tube. A slot in the bottom of the piston allows the balls to drop through and onto the work, in a "curtain" 12 in. long and 1 in. wide, by reason of which the machine is referred to as of 12-in. size. The distance through which the balls fall onto the work, and which, of course, determines the force of the blow, is adjusted by varying the height of the diaphragm, using

a slide and scale provided for that purpose. The table on which the work is placed is reciprocated automatically across the curtain of balls, so that the entire surface of every article upon it is subjected to an intense bombardment.

For testing cylindrical work the machine is provided with a rotating spindle with a tapered hole, into which a mandrel can be fitted that is adapted to hold such parts as gears, bushings, etc. Gears are tested in gangs and are offset from the center of the shower, so that the balls bombard the faces of the teeth. Piston pins can be placed on a roller attachment and rotated.

The hand-operated machine is designed to deliver a shower of 20,000 balls in from 10 to 20 seconds. The article to be tested is placed in a rubber-lined chamber from which rises a pipe of 2 in. inside diameter, with ports in its wall near the top. The balls are placed in a hopper surrounding the pipe, and when the hopper is raised to the top of the pipe the balls roll through the ports in the wall and drop down the pipe. Immediately below the ports there is a regulating grid which serves to impede and regulate the "flow" of the balls. Further down the 2-in. tube the balls fall into a piston which arrests their motion, but (since its bottom is perforated) allows them to start again. The shower of balls thus produced is circular in cross section and about 2 in. in diameter.

The table for holding the work is suspended within the chamber by four rods with ball joints. An indicator on top of the chamber shows what part of the table is actually under the jet of balls at any moment and renders it easy to distribute the bombardment evenly over the work, or, if desired, to concentrate it on any particular area. For testing gears and any other cylindrical objects the table can be slowly rotated by means of a crank and chain drive. The spent balls are caught in a scoop by which they can be returned to the hopper when the test is completed.

These machines can be provided with a conveyor instead of a table to make the process of inspection continuous. But even with a table the process is quite rapid as the work remains in the machine only for about a minute. It is claimed

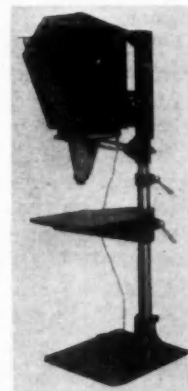


Fig. 2—Projection microscope for use with Cloudburst machine

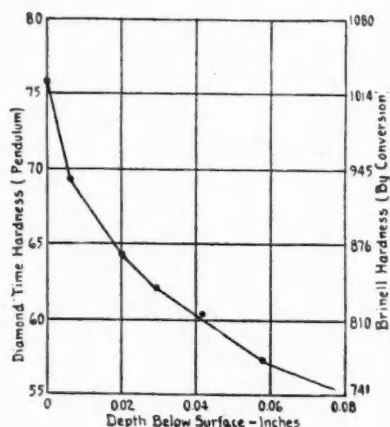


Fig. 4—Hardness gradient below surface after 1.25 per cent carbon steel was subjected to Cloudburst hardening treatment

that the shower of steel balls onto the surface during this short period appreciably hardens it, hence improves the work.

In inspecting production work with these machines,

the actual hardness is not determined as a rule. What is actually being done is to determine inadequate hardness, if any. To this end the piston is so set that the balls will have acquired a velocity such that their impact will not mark the surface if it is of sufficient hardness. If the work is indented by the test, and it is desired to know the actual hardness, this can then be determined by any of the well-known methods, and it can even be judged by the appearance of the surface.

It is also possible to use these machines for inspecting work that must be kept within definite limits of hardness. In that case the height of fall of the balls is so adjusted that the surface is very slightly marked if it is between these limits. For instance, a cutting tool of 600 Brinell hardness is slightly marked by a $\frac{1}{8}$ -in. ball falling from a height of 2 meters. If the tool were of more than 650 Brinell it would not be indented.

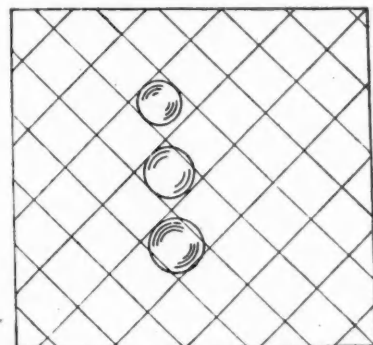
Direct numerical hardness tests can also be made with the Cloudburst machine, and the results can be converted into Brinell, Pendulum or any other standard scale of hardness. For such measurements a smaller number of balls are used, so that overlapping of impressions is prevented and the impressions can be measured.

The impressions can be measured by means of an ordinary microscope, but the work is facilitated by the use of a special projection microscope (Fig. 2) furnished by the manufacturers of the Cloudburst machine. After being subjected to the shower of steel balls for a few seconds, the work is held against the hard steel nosepiece at the bottom of the projector, and the operator, looking through the window at the front, sees a brilliant magnified image of the surface dotted with impressions projected on a white, graduated screen 8 in. in diameter.

The optical system consists of a series of lenses, mirrors and prisms, and a powerful projector lamp. One of the mirrors can be tilted by means of a screw so as to give a slight vertical movement to the image on the screen, and in this way the edge of any impression can be made to coincide with one of the graduation lines with which the screen is ruled. The standard screen has graduation lines corresponding to tenths of a millimeter. It is stated that one-tenth of a division may be estimated by the eye, so that one-hundredth of a millimeter can be read to a fair degree of accuracy.

When it is desired to work between predetermined limits of hardness, the standard screen is replaced by a limit screen ruled with two sets of graduation lines inclined at 45 deg. to the edges. Referring to Fig. 3, it will be seen that the distances between the two sets of lines are different, and the lines divide the screen into rectangles whose sides correspond in length with the limiting diameters of the impression. By tilting the mir-

Fig. 3—Limit screen for projection microscope



ror, the edge of any impression can be made to coincide with a line in either series of graduations, and if the hardness is correct, the impressions will not be less in diameter than the shorter, nor greater than the longer side of the rectangles.

In addition to its use for checking hardness of parts, the Cloudburst machine can be used also for surface-hardening such parts. Balls $\frac{1}{8}$ in. in diameter are employed, and the initial ball velocity is determined by the original hardness of the article. If too high a ball velocity were employed at first, the surface would be roughened by indentations. The initial velocity must be such that the surface layer of steel is slightly displaced, but not sufficient to roughen it.

When the surface has been completely covered by light blows, it is encased in a thin superhardened layer. The treatment is then continued by successively increasing the height through which the balls fall until the maximum hardness and thickness of the superhardened surface layer has been attained. In Fig. 4 the hardness gradient below the surface is shown for a carbon steel article containing 1.25 per cent of carbon which was first hardened by heat-treatment and then superhardened by the process described.

Fiat Diesel Railcar Engine

THE FIAT COMPANY of Italy, which has been building large Diesel engines in one of its departments, has recently developed a new six-cylinder engine of this type for use on rail cars. It has a bore of 160 mm. (6.32 in.) and a stroke of 180 mm. (7.10 in.) and develops 150 b.hp. at 1500 r.p.m. This engine replaces a similar one of 200 mm. bore and 270 mm. stroke which developed 200 b.hp. at 750 r.p.m. While the piston speed of the old engine at its rated crankshaft speed was only 1330 ft. p.m., that of the new engine is 1780 ft., and the brake m.e.p. has been increased from about 64 lb. p. sq. in. The increase in speed is said to have been made possible chiefly by the improved design of the fuel injector. Aluminum alloy pistons are employed in the new engine and a chain is used for driving the camshaft, instead of spur gearing. Where formerly cast steel was used for the engine structure it is now made of cast iron.

This engine is fitted into a railcar which when completely loaded is of 40 tons capacity, of which 22 tons rests on the forward and 18 tons on the rear bogie. With a total train load of 65 tons this railcar has achieved a speed of 31 m.p.h.

THE American Society of Mechanical Engineers has published a booklet containing the annual reports of A.S.M.E. technical committees for 1929. It briefly reviews the activities of the Society's committees on research, standardization, power test codes, the boiler code and safety.

Just Among Ourselves

Shop Equipment Selling Is a Specialized Field

THE car manufacturer who enters into competition with the jobber in the sale of general repair shop equipment will be doing no favor for his dealer organization.

Scores of lengthy arguments might be marshaled to support this view; a few briefly expressed may suffice as a basis for an argument anybody might like to start:

1. General repair shop equipment and tools can reach distribution maximums only through widespread missionary work, strenuous educational effort among dealers, and quick service facilities. The car manufacturer, while he can help materially in this sort of effort, never can supply the daily and weekly type of selling and educational contact provided by thousands of jobber salesmen and missionary men traveling constantly over small areas.

* * *

Car Makers Can Profit By Jobbers' Missionary Work

THE car manufacturer, in the long run, is more interested in getting widespread use and application of proper service tools and equipment than he is in some small immediate profit he might make from the sale of a few items of this character.

The car maker, therefore, has more to gain from fostering and aiding the effort made by jobbers along these lines than from chiseling away through competition some of the profit which makes possible present jobber service to dealers.

2. Quick delivery and assembly and quick, effective service are needed more often than not in connection with shop equipment sales. The jobber is set up to provide such service and does provide it. (In this respect shop equipment selling differs materially from the selling of

automotive parts and accessories.

3. The average dealer regards the jobber as a real friend in need. Regardless of factory wishes, the average automotive retailer gets service and goods from jobbers frequently, and would not be able to operate his business nearly as efficiently as he now does were he to refrain from such buying. The strength of dealer feeling in this regard appears more vividly to the outside investigator than to the factory representative as such, because retailers, naturally, are a bit cautious in expression when talking directly with factory men.

* * *

Calisthenics for That Sluggish Imagination

JUST an advance note to warn the readers of this rambling page that they will soon be bombarded again with urgings to read a particular book, even if it takes them the rest of 1930 to do it. Every once in a while we get into this semi-mania stage about some volume or other; usually about a book which seems to us to be extremely high in its value as a thought and imagination stimulator. The other quality which recommends a book strongly to us is a high degree of ability to jerk the mind out of its routine thought-grooves and force into something like proper perspective the little events which make up our individual daily lives.

A. S. Eddington's "Nature of the Physical World" is the book that is stirring up our mind at the moment. It is an attempt by the Professor of Astronomy at University of Cambridge to interpret the philosophical significance of the latest scientific developments in connection with the theory of matter. It is written for the layman, but the complexity of the subject which it discusses is such as to

make its reading require hard, concentrated mental effort even on the part of the average engineer.

At the moment we are one-third of the way through, but are already willing to guarantee that the effort is well worth while.

* * *

"Things Ain't— What They Seem to Be"

OUR first contact with this interesting volume came as a silent and much-awed listener to a two-hour discussion of the book between B. B. Bachman, a former president of the S.A.E., and Ray Buckendale, executive engineer of Timken - Detroit Axle Co. The talk took place during an S.A.E. transportation meeting up in Toronto some months ago and... (*whisper*)... gave us more food for thought than all the papers delivered at said meeting.

Being more confused at the end of the discussion than at its beginning, however, we determined to wade into the volume ourselves and now have finally engaged in the task.

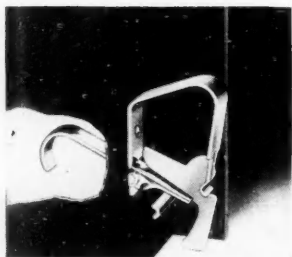
We say task advisedly. The task consists, not primarily in understanding the statements made, but in straining the mind to visualize a multitude of conceptions entirely foreign to our regular thinking about "things as they seem to be." For instance—"Space is finite but boundless." . . . Well, we daren't talk much more about this book just now or our ignorance would become even more apparent than usual. Confidentially, we are just getting started on it again after a two-day intermission to try to find out exactly what entropy is and why it can never diminish. We've asked three good engineers and have found out what it is—by the time our next issue comes out we hope to have gotten through our head why it can never diminish. . . .

—N.G.S.

NEW DEVELOPMENTS—Automotive

Wiley Hood Latch

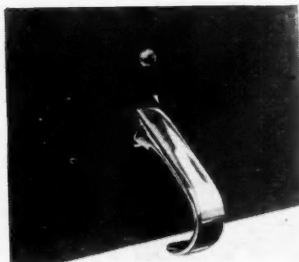
A NEW hood latch for original equipment is being offered by the Wise Chrome Products Co. of Detroit. As shown in the accompanying illustrations, all



The Wiley hood latch in the open position, with the hood ready to lift. Pressing down the handle will lock the hood in place

The same lifting motion of the handle both unlocks the latch and lifts the hood. No additional hood lift handles are required. It also eliminates fastening devices on the hood sill, making for a cleaner appearance. Hood lift handles are chrome-plated. Concealed parts also are rust-proofed, as by cadmium plating, according to purchaser's requirements.

parts except the locking handle are concealed beneath the hood. The locking mechanism is of the toggle type. The short semi-tubular rod against which the lower arm of the cranked lever bears in the closed position is attached to the front cowl pillar or strengthening flange. At the front end the corresponding rod is attached to the radiator shell. In this manner, the hood serves partly as a brace for the radiator shell also.



Exterior view of hood with Wiley hood latch in the closed position

Double Disk Grinder

AN electrically driven double disk grinder for continuous production has been placed on the market by the Hammond Machinery Builders, Kalamazoo, Michigan. This machine has a totally inclosed sealed



Hammond double disk grinder

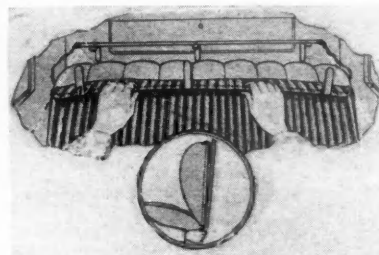
motor, cooled by a fan mounted on the spindle. All incoming air passes through the air cleaner which is mounted directly in the back and connect to a cored end bell. The motor has a high overload capacity and operates at less than 40 deg. temperature rise. It is said to be capable of withstanding severe momentary shock without excessive heating.

The disks are machined on both sides and reversible so that two disk wheels can be mounted at one time.

After one is worn, it can be reversed, rendering twice the amount of service hours with one operation of changing and mounting. Standard equipment includes one plain table and one lever feed table. This machine can also be supplied with either two lever feed tables or two plain tables. Push button control is conveniently mounted in a recess in the front of the pedestal. A Cutler-Hammer automatic motor starter with overload protection, low voltage protection and phase failure protection is standard equipment. This machine can be supplied in sizes from 3 hp. to 10 hp. with disks, 12 in. to 24 in. diameter.

Seat Cover Attachment

AN improved method of attaching automobile seat and panel covers has been devised by the Crawford Mfg. Co., Inc., of Richmond, Va. As shown by the illustration, a flat strip of steel is sewed in the back cover hem, and L-shaped steel angle brackets that slip between the back of the upholstery and the body of the car are attached to this strip. Cords attached to the ends of the steel strip can be pulled down tightly and fastened, thereby causing the cover



Steel-Stay installation of seat covers

to conform to the contour of the seat. It is claimed for this new "Steel-Stay" attachment that it makes a simple and positive fastening.

Covers for side panels and doors have "nickel-on-brass" grommets which slip over the hardware easily, and bellows-type, elastic-topped pockets for both front doors. Side covers are attached with two-prong pin fasteners.

The covers are made in Dobby cloth in tan and blue combination and reinforced with duotone art leather.

Oxweld Welding Blowpipe

OXWELD ACETYLENE CO., 30 E. Forty-Second St., New York, has recently announced another new blowpipe. This type W-17 employs the low-pressure injector principle used in other Oxweld blowpipes, and is similar in design to the type W15 aircraft welding blowpipe, but is large enough for any welding job.



Type W-17 Oxweld blowpipe

The tip and welding head are of one-piece construction, being combined in a long and slender stem of the goose-neck type. The injector is located at the base or handle-end of the stem. Each of the ten welding heads furnished has its own nut for attaching it to the handle of the blowpipe. The nut extends beyond the injector when the welding head is detached from the blowpipe and serves to protect the injector from damage due to careless handling. A

Parts, Accessories and Production Tools

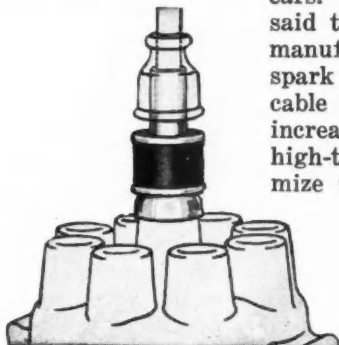
fine-pitch thread makes it possible to tighten or loosen the nut easily without the use of a wrench. The handle is made of special fluted brass tubing which offers a sure grip to the operator and also reinforces the handle.

The type W-17 blowpipe with the No. 4 welding head weighs only 24 ounces. The long, thin shape of the welding heads makes it possible for this blowpipe to be used in comparatively inaccessible places.

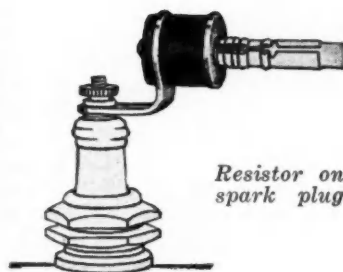
Allen-Bradley Resistors

THE Allen-Bradley Company, Milwaukee, Wis., is manufacturing resistors for the suppression of interference from ignition systems in radio-equipped cars. These resistors, which are said to be fitted by several car manufacturers, are used on all spark plugs and on the common cable to the distributor. They increase the resistance of the high-tension circuit and minimize the disturbing oscillations in the ignition circuit which interfere with the operation of a radio receiver in the car. When used with suitable bypass condensers in other parts of the ignition circuit, the need for shielded ignition cables is eliminated.

Dynamometer tests are said to have shown that the power output of engines is not affected by the use of these resistors, and cold tests revealed that they introduce no difficulty in the starting in cold weather. The resistance is approximately 25,000 ohms, and is said not to vary appreciably after long use.



Allen-Bradley resistor for distributor



Resistor on spark plug

Paasche Universal Striper

LINES, stripes, and curves may be mechanically produced by means of the type MU pencil model striper recently announced by the Paasche Airbrush Co., Chicago, Ill. Lacquer, paint, enamel, striping fluids or any finishing material in one or more colors appear as inlaid work due to the uniform and even flow of color which is regulated to feed as fast or as slow as the work requires. An adjustable tip enables the operator to produce a stripe from 1/32 in. to 3/32 in. wide.



Paasche pencil striper

The color cups are detachable and an extra pressure color cup may be attached for striping overhead or underneath when it is necessary to force fluid upward to the slotted tip or when heavy colors are used

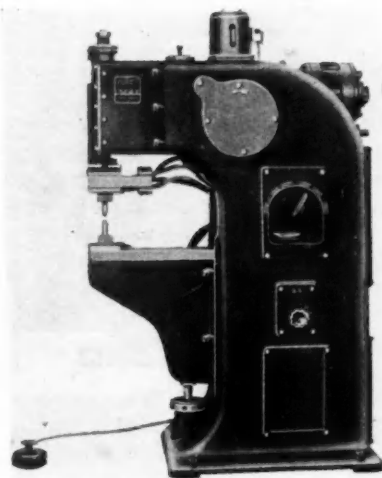
for obtaining a raised or embossed stripe, scroll or decoration. The pressure cup has a screw cover with plunger operated by a spring which continually feeds the color under pressure.

Spot and Projection Welder

FOUR welding speeds, controllable by a hand wheel, are available with the new "Challenger" spot and projection welder made by The Taylor-Winfield Corp., Warren, Ohio. It will weld two pieces of 3/8-in. stock on slow speed with the large-size transformer and 18-in. throat depth, while on projection welding its capacity is five projections in an area of 7 sq. in. on 1/8-in. stock.

The operating head is well aligned by means of long slides and is actuated by a toggle-operated cam. A remote control switch is provided for heat control, while the trip switch is located conveniently on the floor. Water cooling is automatically controlled by a switch which allows water to flow only at the time of welding. Clutch and transmission are operated magnetically within a totally enclosed housing which serves as an oil reservoir.

The motor is 1 hp. capacity of constant torque type. The transformer is of the "pancake" type, water-cooled throughout, having a capacity of 40 to 80 KVA on 50 or 60 cycle current; 30 to 60 KVA on 25 to 30 cycle current. Standard throat depths are 12 in., 18 in., 24 in., while a 30-in. depth is possible by using special overhang arms. Floor space required is 25 by 45 in., while the height is 74 1/2 in. Net weight is 3100 lb.



Taylor - Winfield Challenger spot and projection welder

Barrett Lift-Truck

CAPABLE of handling 2500 lb. loads, the new light duty Red Junior Barrett Lift-truck has been placed on the market by the Barrett-Cravens Co., Chicago, Ill. Among the features claimed for this truck are the following: a spring handle hold-up which prevents the handle from falling to the floor; a roller bearing latch catch, and an automatic engaging latch.



Red Junior lift-truck

This unit is equipped with Hyatt roller bearings and Alemite lubrication. It is available in 120 standard stock models.

Lettering on Drawings

FROM a questionnaire recently sent to the industries and to educational institutions by a sub-committee on Lettering of an American Standards Association Committee on Standards for Drawing and Drafting Room Practice, it developed that the industries are in favor of vertical lettering while the educational institutions favor inclined letters. As in script, sloped letters invariably carry personal characteristics of the individual. It is noticeable that vertical lettering is more legible in the blueprints.

Tool Room Grinder

FINISHING costs on tools and die sections are said to be reduced by "Grindite," a new high-speed tool room grinder, recently announced by the Koestlin Tool & Die Corporation, Detroit, Michigan. This machine eliminates filing operations and is especially effective for contour and radius grinding. The head is adjustable to any angle and is thus adaptable to the grinding of any kind of form.

The grinding wheel is 3½ in. face, 8 in. diameter, and operates at 1750 r.p.m. Power is supplied by a one hp. Clark electric motor. The net weight of the machine is 600 lb. Floor space is 29 x 33 in., the height being 58 in. overall.

Equipment Wholesalers Necessary

(Continued from page 428)

where a daub of grease ought to be? To the uninitiated, this type of complaint will seem ridiculous, but men who have sold shop equipment for years know that the average service station mechanic applies his mechanical genius mostly to the cars that he repairs, not to the equipment that he uses.

Who will stock and often supply, at an hour or two notice, the broken part in a piece of shop equipment? Will the car factory, that distributes shop equipment, make parts available to their dealers through their distributors and branches? The dealer who buys through jobbers is accustomed to this kind of service. He can't afford to have a piece of his machinery tied up for days while he waits for the factory a thousand or more miles away to ship the part. A farmer will cut up an old shoe to make a washer for his spraying outfit, but the repairman who needs the same kind of a washer in his car washing machine expects his jobber to supply one by special messenger.

When the dealer who has purchased a new piece of equipment decides he doesn't want it, or even discovers a flaw in it, who will take it apart, pack it, check it, and ship it back to the maker? When the dealer says: "Come and get it," and refuses to pay, will it be the job of the car distributor's traveling man, the factory service representative, or somebody else to inspect the machine, verify the dealer's opinion, obtain permission of the factory to return it, and take care of the shipping?

Who will keep the piece of equipment, distributed by the car factory, sold to the car dealer against the aggressive competition of a salesman of a rival equipment company?

What will the car factories do, if anything, about the used equipment phase of the business which has been developing rapidly in the past few years? There is plenty of competition in the equipment business and, if it weren't for the inability and disinclination of shop equipment manufacturers to force their product upon dealers, that branch of our industry probably would have a serious equipment problem, just as the car factories have a serious used car problem.

There is a market for used shop equipment just as there is a market for used cars. The dealer has held the bag on used cars, but who will hold the bag on used equipment?

At the present time, the only organizations which

have facilities for selling used shop equipment are the automotive jobbers.

The car factory cannot overlook these and many similar problems which are a part of the everyday job of the jobber and the jobber salesman who sells shop equipment. At the present time, the shop equipment business has an organization composed of factory salesmen, factory service men, factory missionary men, jobber salesmen, jobber equipment specialists—all contacting prospective customers and present owners of shop equipment. The jobber salesman is calling periodically on shop equipment owners and meeting these problems or directing them to the proper source of solution.

Jobber service departments, jobber shipping departments, jobber billing departments, jobber parts departments—all of these now exist for the service of the equipment sold to car dealers and repair shops.

If the car manufacturer, cognizant of the problems of shop equipment distribution, is primarily interested in strengthening the dealer organization in his service contacts with owners and prospective owners, the way seems open to the development of a plan of car factory participation in distribution of equipment, which provides for the physical distribution of equipment through automotive wholesalers at a fair profit to them, plus cooperation of car factory sales and service personnel in the selection and sale of the necessary service machinery to its dealers to accomplish the primary objective.

If, on the other hand, the car factory, unacquainted with the service problems of shop equipment distribution, adopts a plan of action which does not carry with it the service advantages now obtainable by the average purchaser of shop equipment, we predict much grief for the car manufacturer and the equipment manufacturer and the car dealer.

Widespread use of better shop machinery and methods can be brought about more effectively by the application of proven methods of shop equipment merchandising and distribution than by the introduction of competitive systems.

Any plan which limits the effectiveness of shop equipment merchandising and distribution tends to defeat both of the major reasons for car factory participation in its distribution: 1—Better equipment of shops; 2—Shop equipment profits for the factory service department.

Revision of Aluminum Specifications Proposed by Standards Division

*Subdivision of Non-Ferrous Metals committee, S.A.E., prepares
new draft for submission at next summer's meeting.*

A DRAFT of revised aluminum alloy specifications has been prepared by a subdivision of the Non-Ferrous Metals Division of the S.A.E. Standards Committee. Specification No. 30, which is the first on the present list of aluminum alloy specifications, is to have the following note appended:

"For more difficult castings alloy No. 36, which has similar mechanical properties and superior casting characteristics, is now commonly specified."

This alloy No. 36 is a new one so far as S.A.E. specifications are concerned and has the following composition:

SPECIFICATION No. 36	
Composition in Percentage	
Copper	7.0—8.5
Silicon	1.0—1.5
Iron	0.8—1.4
Zinc	not over 0.2
Manganese	not over 0.3
Magnesium	not over trace
Other impurities	not over 0.3
Aluminum	Remainder

This alloy was developed from alloy No. 30 and differs from it only in that iron and silicon are added in definite amounts instead of being allowed to vary at random in the range permitted by the limit on impurities to improve the casting characteristics. With this alloy, the tendency for cracks and shrinks is greatly decreased.

SPECIFICATION No. 31A	
Composition in Percentage	
Copper	2.0 — 3.5
Zinc	9.0 —11.5
Iron	1.25— 1.75
Total Other Impurities	not over 1.0
Aluminum	Remainder

Test specimens cast in sand and tested without machining give tensile strengths in the range 25,000 to 36,000 lb. per sq. in. and elongations from 3 to 7 per cent in 2 in.

SPECIFICATION No. 37	
Composition in Percentage	
Silicon	12.0—13.0
Iron	not over 0.8
Copper	not over 0.3
Zinc	not over 0.2
Manganese	not over 0.5
Magnesium	not over trace
Total Other Impurities	not over 0.3
Aluminum	Remainder

Standard test bars, cast to size in sand, show tensile strengths from 24,000 to 31,000 lb. per sq. in. and elongations from 5.0 to 15.0 per cent. These prop-

erties are obtained only if the molten alloy is subjected to a special process, known as "modification," immediately before it is poured. The specific gravity is 2.68.

Like alloy No. 35, this alloy is especially resistant to salt water corrosion. Because of its good foundry characteristics it can be used for complicated castings consisting of both thin and heavy sections.

SPECIFICATION No. 38 (HEAT-TREATED CASTINGS)	
Composition in Percentage	
Copper	4.0—5.0
Silicon	not over 1.20
Iron	not over 1.20
Zinc	not over 0.25
Total of all constituents except aluminum and copper	not over 2.5

Castings from this alloy can be heat-treated to produce mechanical properties distinctly higher than those of the ordinary aluminum casting-alloys.

Where maximum toughness and resistance to shock are desired, a solution heat-treatment alone is used, which produces in sand-cast test-specimens tensile strengths from 28,000 to 38,000 lb. per sq. in. and elongations from 6 to 12 per cent in 2 in. On standing at room temperatures, there is an aging effect which is practically complete in a few months. The tensile strength increases by a few thousand pounds per square inch, and the elongation decreases by a few per cent.

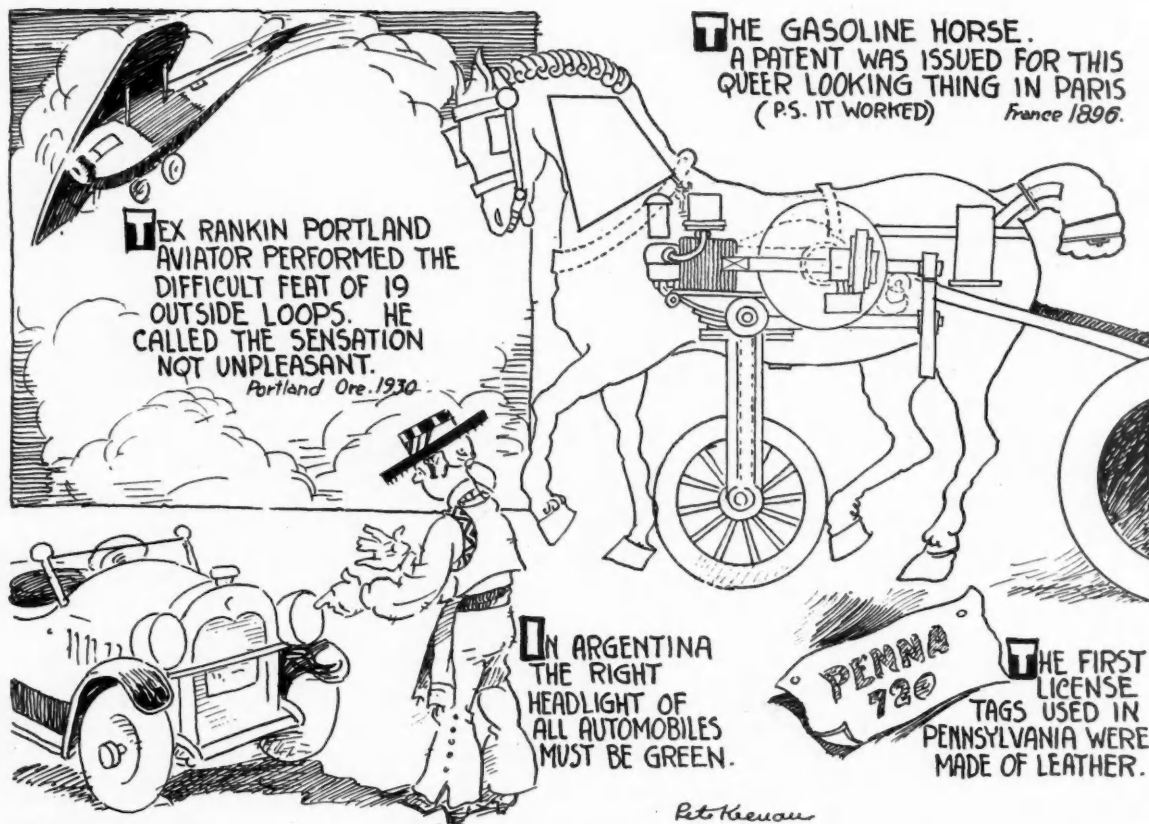
If somewhat greater initial strength, hardness, and yield-point are desired, the solution heat-treatment may be followed by a precipitation heat-treatment in which tensile strengths from 30,000 to 40,000 lb. per sq. in. and elongations from 3 to 8 per cent in 2 in. are developed.

SPECIFICATION No. 39	
Composition in Percentage	
Copper	3.75—4.25
Nickel	1.8 —2.3
Magnesium	1.2 —1.7
Iron	not over 1.0
Silicon	not over 0.7
Total other impurities	not over 0.2
Aluminum	Remainder

Standard test-specimens, cast to size in sand, after proper heat-treatment, show tensile strengths from 30,000 to 42,000 lb. per sq. in. and elongations from 0 to 2.0 per cent. If the alloy is not heat-treated, the tensile strength is about one-third less than these values. Because of its property of retaining its strength better at elevated temperatures than do many of the other aluminum alloys, it is used for pistons and cylinder-heads of aircraft engines and for other parts where this property is an advantage.

Automotive Oddities

by Pete Keenan



News of the Industry

PAGE 453

VOLUME 62

Philadelphia, Saturday, March 15, 1930

NUMBER 11

Output, Labor Figures Reported

Other Announcements Show Economic Aspects of Junking Plans

PHILADELPHIA, March 15 — A slight recession in the production of passenger cars is apparent as the automotive industries swing into the end of the first quarter of 1930, production reports telegraphed to *Automotive Industries* from producers contributing to the Weekly Production Index show.

Production schedules for the current week show an optimistic tendency, however, and it is expected that when final reports are received this week's output will show a firm improvement. Production for the week ended March 8 showed a decrease of approximately 40 per cent as compared with the corresponding week last year. A graphical chart of production factors appears on page 456 of this issue.

Changes in automotive employment in the state of Michigan were reported this week by the Michigan State Commission on Labor and Industry. Only passenger car manufacturers are represented in the figures, which are summarized on a box on this page. Last week the Bureau of Business Research of Ohio State University reported that employment in the automotive industries in the state of Ohio was 12 per cent greater in January of this year, than in December of last, while it was 36 per cent less than in January of 1929.

The Institute of Scrap Iron and Steel, at a convention last week, made an announcement of considerable importance to the effort of passenger car manufacturers to promote junking plans. The Institute, it was stated, has passed a resolution to cooperate with the National Automobile Chamber of Commerce in working out plans to utilize the machinery of the scrap iron industry in the handling of the 400,000 old automobiles which are expected to be scrapped under the highway program of the Chamber.

Parker Bill Delayed

WASHINGTON, March 13—Having extended the period for general debate from the original 6 hours allotted, the Parker motor bus, which was taken up

in the House yesterday, will not be acted upon until Friday. General debate will continue throughout today and amendments will be in order under the five-minute rule tomorrow.

Michigan Automotive Employment Gains

Number of Employees		
Dec., 1929	Feb., 1930	Gain
166,336	179,962	+ 2%

Amount of Payroll		
Dec., 1929	Feb., 1930	Gain
\$4,300,005	\$5,318,558	+ 23%

Figures supplied by Michigan State Commission on Labor and Industry, covering employment in the automobile industry throughout the state.

Color Index Shows Brown Near End of Leadership

NEW YORK, March 13—"Although brown still retails leadership over the five principal automobile color families it appears to have reached the peak of its present climb," according to the *Automobile Color Index* for March, published by the Duco Color Advisory Service.

Next month will probably determine whether or not the upward movement of the brown group has been permanently checked, the *Index* says. The color families with their relative position and index number for February are as follows: First, brown, 160; second, blue, 143; third, green, 100; fourth, black, 83; fifth, maroon, 72; sixth, grey, 35.

Green will probably remain steady at about its present index position during the spring months, with preference accorded the lighter shades and tints, according to the *Index*. The downward movement of the black trend appears to be checked for the present, while maroon continues to forge ahead.

Hoover Ball Net Gains

DETROIT, March 13—The Hoover Steel Ball Company, Ann Arbor, Mich., has announced earnings for the year ending Dec. 31, 1929, of \$335,139, equivalent to \$2.28 per share after depreciation and federal taxes. This compares with \$1.71 per share in the preceding year. The usual three per cent quarterly dividend payable April 1 was authorized at the annual meeting held yesterday.

Radio is Announced by General Motors

New Delco Car Set to be Widely Sold and Serviced

DETROIT, March 13—After a long period of research and experimentation, the General Motors Corp. has announced a radio receiving set for automobiles together with complete plans for servicing and national distribution. The set has been called the Delco Automotive Radio and is manufactured by the Delco Corporation at Dayton, Ohio. National sales and service are under the direction of United Motors Service with 27 branches and 3000 authorized service stations.

The Delco automotive radio is a five-tube receiver, using three screen-grid tubes, and operated by remote control from the instrument panel. It can be installed without changing any units of the car.

Simplicity and neatness are features of the set, which is entirely out of sight beneath the car's cowl. Only three devices are to be found on the instrument panel—mounted at the right, where they do not interfere with the other instruments. They are a tuning dial, a volume control and a key switch. The tuning dial is connected to the set by a flexible cable and operates three variometers, all mounted on a single shaft.

In the Delco automotive radio, two tuned radio frequency stages are used with 224 amplifier tubes, connected in series. A similar screen grid tube is used as a detector. For audio frequency a 227 tube is used in the first stage and a 112-A in the second. A voltage regulator tube is employed to keep the voltage constant in spite of varying engine speeds or extra drain on the battery when the lights are turned on. This is an exclusive feature and prevents surging of volume, keeping the tone even under all conditions.

Reynolds Spring Income Gains

DETROIT, March 13—Reynolds Spring Co., Jackson, Mich., has reported net income for 1929 of \$114,962, compared with only \$3,591 in 1928. Deficits were reported in 1926 and 1927, but earnings have improved since the reorganization in 1928 when the present management assumed control.

Men of the Industry and What They Are Doing

Baldwin Assists Childs

WASHINGTON, March 13—The appointment of Charles F. Baldwin, Marietta, Ohio, as Assistant Chief, Automotive Division, Bureau of Foreign and Domestic Commerce, succeeding A. W. Childs, who was recently promoted to chief, has been announced by Director William L. Cooper. Mr. Baldwin entered the service of the Department of Commerce in December, 1925, and was assigned to duty in the Division of Current Information. In July, 1927, he was promoted to the rank of Assistant Trade Commissioner and assigned to Melbourne, Australia, office of the Department of Commerce. He was later promoted to be Trade Commissioner. During the past year Mr. Baldwin has devoted most of his time to a study of conditions in the Australian markets as they influence the sale of American automotive products.

Vavon and Haardt Return

Paul Vavon, chief engineer for Societe Anonyme Andre Citroen, and George Marie Haardt of the same company returned last week on the S. S. *Ile de France* after a visit to this country which comprised about two months. They came to the United States at the time of the New York show and have spent the intervening weeks visiting the factories and parts suppliers in this country. Robert Bult, European director of Firestone Import A. G. at Basle, Switzerland; George R. Vlober, European district manager for Firestone, and G. Pastori, manager of the Societe Anonyme Gomme ed Affini, distributor of Firestone products, also sailed on the S. S. *Ile de France* at the same time.

Schrader Elects Hunter

William T. Hunter has been elected president and general manager of A. Schrader's Son, Inc., Brooklyn, N. Y., maker of tire pressure gages and tire valves. Mr. Hunter was formerly vice-president and general manager of the Schrader company. Mr. Hunter was also elected a director of the Scovill Manufacturing Co., Waterbury, Conn.

Casey Becomes Manager

J. E. Casey, formerly associated with the Detroit zone office organization of the Chevrolet Motor Co., has become manager of the Detroit Chevrolet Dealers Association. Mr. Casey succeeds Harry Lamster, who goes to Elkhart, Ind., to take over a Chevrolet dealership.

Mullins Appoints Keyes

Gordon F. Keyes has been appointed general sales manager of the Mullins Mfg. Co., Salem, Ohio. Mr. Keyes is a director of the company, and has been connected with it for 10 years, serving in various capacities, including that of manager of the tool and die division.

Baldwin to Direct Car Radio Sales

CLEVELAND, March 12—C. Russell Feldmann, president of the Automobile Radio Corp., manufacturers of Transitone and automobile radio, has announced that L. G. Baldwin, for the past 13 years connected with the sales end of Willard Storage Battery Co. of this city and lately in charge of radio sales for that organization, has been appointed sales director of Automobile Radio Corp. Mr. Baldwin assumes charge of sales of the automotive radio group, following the recent merchandising arrangement with the network of 42,000 Willard Service stations in the United States whereby Transitone radios for motor cars are sold, installed and serviced. Mr. Baldwin's offices will be in the headquarters of the Automobile Radio Corp. at 4616 Prospect Avenue, this city. Nation wide sales will be handled from this office, it was announced by Mr. Feldmann.

Van Sicklen Elects Corey

Directors of the Van Sicklen Corp. have named R. L. Corey vice-president and general manager to succeed A. B. Wagner, who recently died. Mr. Corey was also elected a director and C. F. Van Sicklen was named a vice-president. Other officers were reelected. They are: N. H. Van Sicklen, Jr., president; C. C. Veneman, vice-president; E. Q. Kruchten, secretary and treasurer, and P. G. Brown, assistant secretary and treasurer.

Hutchinson and Smith at Factory

R. A. Hutchinson, assistant sales manager of the Studebaker-Pierce-Arrow Export Corp., and Dewey W. Smith, Studebaker-Pierce-Arrow sales supervisor in the Orient and Far East, are in South Bend for a series of conferences with factory officials. Mr. Hutchinson will sail for Rio de Janeiro on March 21, and Mr. Smith to Calcutta on a later date.

Globe Elects Bishop

At the annual meeting of the Globe Forge and Foundries, Inc., E. R. Bishop was elected president to succeed the late W. Charles Lipe. Mr. Bishop was formerly vice-president and treasurer of the company.

Evans Appoints Betts

Edward S. Evans, president of the Detroit Aircraft Corp., announces the appointment of Karl S. Betts as assistant general sales manager in charge of dealers and distributors.

Verville Appoints Deering

R. S. Deering has been appointed general manager of the Verville Aircraft Co. For 20 years Mr. Deering has been connected either with the manufacture or distribution of automobiles. He was president of the Stevens-Duryea Co. and president of the Rausch & Lang Electric Co.

Wisconsin Elects Otto

Jesse W. Otto, formerly vice-president, has been elected president of the Wisconsin Machinery & Mfg. Co., Milwaukee, to succeed the late William H. Vogel. O. W. Brown has been elected vice-president. Louis E. Vogel is secretary and treasurer. The company manufactures pistons and other motor specialties.

Peerless Appoints Embleton

Charles G. Embleton, who has been connected with the automotive industry for 28 years in eastern cities and Chicago, has been appointed branch manager of the Peerless Motor Car Corp. in the Chicago territory.

Lee Returns to U. S.

F. Robert Lee, vice-president of the Thermoid Rubber Co., has returned to the United States after spending several weeks visiting the company's branches in Europe.

Greenfield Revising Schedules

GREENFIELD, MASS., March 11—The Greenfield Tap & Die Corp. is concentrating its production at its Wells Bros. and Wiley & Russell divisions and has discontinued operations at its other buildings, except in the case of its drop-forging plant at Turners Falls. This, with a thorough rearrangement of the first-named plants, is designed to effect economies of production.

Federal Steel Adds Workers

MILWAUKEE, March 10—Increased orders for automobile and truck bumpers and metal spare-tire covers have made it necessary for the Federal Pressed Steel Co., Milwaukee, to enlarge its force by 75 men, bringing the total to upward of 300. Since early in February the plant has operated a night shift.

Pierce-Arrow Shipments Gain

BUFFALO, March 10—Pierce-Arrow passenger car shipments for the first two months of 1930 were 84 per cent greater than those for the corresponding period of 1929, it was announced today by A. J. Chanter, vice-president and general manager.

Borg-Warner '29 Earnings Reached \$6.03 Per Share

First Annual Report of Company
Just Issued

CHICAGO, March 12—The first annual report of the Borg-Warner Corp. and its subsidiaries, covering the year ended Dec. 31, 1929, shows net income equivalent to \$6.03 a share on the common stock, a current position of better than 4 to 1 and cash and liquid securities amounting to almost twice the total of current liabilities at the end of the year. Net income for the period amounted to \$7,682,590, which, after providing for preferred stock dividends and the minority stockholders interests, equals \$6.03 a share on the 1,230,595 shares of common stock.

Current assets at Dec. 31, 1929, amounted to \$19,221,823, including \$8,401,096 of cash or marketable securities, as compared with current liabilities of \$4,391,798. The balance sheet shows reductions in funded debt and preferred stock of subsidiaries outstanding.

"Borg-Warner operations during 1929 have not only been currently successful, but certain constructive measures for the future have been put into effect," C. S. Davis, president of the corporation, says in his remarks to the stockholders accompanying the annual statement. "Much more will be done in this respect during the year 1930."

New Way in Receivership

DETROIT, March 11—The New Way Motor Co., Lansing, Mich., came to the end of its corporate existence last week when J. W. Wilford, president of the company and industrial leader and banker, was named receiver following a petition for temporary receivership by the board of directors. Court set a hearing for April 24 and directed Mr. Wilford to furnish a bond of \$20,000. The book assets, according to the petition, total \$916,400. The company owes \$375,061 and certain creditors have threatened suit, the petition stated. The firm was incorporated in 1905.

Curtiss Plane in Laboratory

NEW YORK, March 11—Major William B. Robertson, president of the Curtiss Robertson Airplane Mfg. Co., subsidiary of Curtiss-Wright Corp., has delivered the new Whirlwind powered Kingbird to the experimental laboratories of the Curtiss Aeroplane & Motor Co., at Garden City after a series of long cross-country test flights. The Kingbird will undergo final engineering refinements at the Garden City plant before production is started.

Walker Vehicle Expanding

CHICAGO, March 11—The Walker Electric Vehicle Co. is planning expansion of its plant on a large scale. Contracts have been let for a one-story addition, 300 by 390 ft., which is expected to cost \$250,000.

News in Brief

Chicago Pneumatic Tool Co. has announced the opening of a branch office at 327 Philcade Bldg., Tulsa, Okla., with George J. Lynch in charge.

A Willys-Overland, with the transmission locked in second gear, ran from Los Angeles to San Diego, 132 miles, in 2 hr. 57 min., or an average speed of 44.76 m.p.h., according to a factory announcement.

A. G. W. Brown, who has been research engineer for the Fifth Ave. Coach Co. for the past eight years, has been appointed automotive engineer for the Bordens Farm Products Co., New York.

Limousine Body Co. employees are participating in a group insurance plan involving more than \$300,000 coverage.

W. C. Minier and S. C. Lorenz have been added to the Cleveland staff of the Reading Chain & Box Corp.

Geometric Tool Co., New Haven, Conn., has opened its own office in Detroit, Room 315-B, Stormfultz Bldg.

Cutler-Hammer, Inc., has appointed S. J. Burd as manager of its Philadelphia office to replace T. E. Beddoe, resigned.

Reliance Mfg. Co., Massillon, Ohio, advises that it has moved its Chicago office to the fifteenth floor of the Straus Bldg.

Modern Tool Works, Rochester, N. Y., has announced that George H. Diers has been appointed sales representative in the Cincinnati territory. The company will be represented in Indianapolis by the Thompson Tool & Supply Co.

Quality Aluminum Casting Co., Waukesha, Wis., announces the completion of its heating-treating equipment installation.

Delco-Light Co., General Motors subsidiary, announces the quantity manufacture of Delco gas for use in homes not fed by city gas mains.

Budd Wheel Co., Detroit, recently shipped to its New York distributor the largest single order of truck hubs ever loaded.

National Safety Council announces that its offices were moved March 1 from 108 East Ohio Street, Chicago, to the Civic Opera Bldg., 20 North Wacker Drive, Chicago.

Nash Motors Co., Kenosha, Wis., has added more than 200 new dealer organizations since the new series of cars was announced in October, 1929.

The Triplex Machine Tool Co., New York, has been appointed dealer for New York City and vicinity for The Porter-Cable Machine Co. of Syracuse.

The Russell Mfg. Co., Middletown, Conn., announces the opening of a new branch at 411-414 Interim Warehouse Bldg., Detroit, Mich., on April 1.

Senate Confirms Willys

WASHINGTON, March 13—The Senate has confirmed the nomination of John N. Wilys to be ambassador to Poland.

Steel Prices Seem Firm as First Quarter Ends

Semi-Finished Market May Rise
\$1 Per Ton

NEW YORK, March 13—The spread between the capacity of mills and the current demand continues impressive, but second quarter prices look much the same as did those in vogue during the first quarter. Chicago as well as Youngstown rollers of black sheets are striving hard to put the market on a firm 2.75 cents basis. The cold-rolled strip market continues at 2.65 cents, Pittsburgh. Fender stock is quoted at 4 cents, Pittsburgh. Full-finished automobile sheets continue to be quoted at 3.90 cents, Pittsburgh.

There is some talk about makers of semi-finished steel marking their prices up \$1 per ton for second quarter. With all of the complaints of backward demand, the leading interest's unfilled tonnage statement, which was given out on Monday, makes an excellent showing, denoting an increase of 11,038 tons in a month that, as a rule, shows a decrease because February is usually a heavy month for rail shipments and a light one for rail orders.

Pig Iron—Buying continues spotty, but quite a few automotive foundries have bought small lots for nearby shipment. Prices are nominally unchanged, with the markets everywhere quite easy.

Aluminum—Stocks of foreign aluminum in bonded warehouses at the beginning of February were approximately 7,750,000 lb. as compared with 10,000,000 lb. at the beginning of the year and 11,250,000 lb. at the beginning of February, 1929. The market is quiet and quotably unchanged.

Copper—Better employment conditions are once more reported from the Connecticut Valley brass centers, the leading producers of automotive brasses working virtually at two-thirds of their capacity. The electrolytic copper market remains at 18 cents, with consumers buying metal as they need it.

Tin—Bargain-hunters had ample opportunity within the last few days to pick up metal at very attractive prices, the prompt Straits market at the opening of the week being quoted at 36½ cents. There is much talk of restricting output and of all sorts of fanciful stabilization schemes.

Lead—Declines followed one another in such rapid succession early this week that it was difficult to keep track of the downward changes. The week's opening price was 5.50 cents, New York. There were four price cuts in four days, but a sharp rebound is looked for as soon as London congestion is relieved.

Zinc—Dull and easy at 5 cents, East St. Louis.

Form Foundry Corporation

PATERSON, N. J., March 10—The Alloys Foundry Corp. has been formed to manufacture aluminum heat-treated alloy castings and will operate a plant at West Paterson. The officers are C. B. Brown, president; Harry G. Lamker, secretary and treasurer, and Harold J. Neff, vice-president. Mr. Lamker was formerly foundry superintendent of the Wright Aeronautical Corp., and Mr. Neff is a former sales manager of the Walker & Levett Co., New York.

Financial Notes

General Tire & Rubber Co. has declared regular quarterly dividend of \$1.50 on preferred, payable March 31 to stockholders of record March 20.

Auburn Automobile Co. has declared regular quarterly dividend of \$1, payable April 1 to stockholders of record March 21, and a 2 per cent stock dividend payable April 1 to stockholders of record March 10.

Chicago Pneumatic Tool Co. has declared regular quarterly dividend of 87½ cents on convertible preferred, payable April 1 to stockholders of record March 20.

Mack Trucks (International Motor Co.) has declared regular quarterly dividend of 50 cents payable March 31 to stockholders of record March 15.

Perfect Circle Co. has declared regular quarterly dividend of 50 cents, payable April 1 to stockholders of record March 20.

Ross Gear & Tool Co. has declared regular quarterly dividend of 75 cents, payable April 1.

Timken-Detroit Axle Co. has declared regular quarterly dividend of 20 cents, payable April 1 to stockholders of record March 20.

Greenfield Tap and Die Corp. reports net earnings after charges but before Federal taxes for 1929 of \$659,655, as compared with \$506,852 for the previous year.

Allied Motor Industries, Inc., reports net profit for 1929 after all charges of \$211,599. Regular quarterly dividend of \$1 has been declared on preferred stock payable April 1 to stockholders of record March 15.

Brockway Motor Truck Corp. has declared regular quarterly dividend of \$1.75 on preferred payable April 1 to stockholders of record March 6.

Federal Screw Works, Detroit, and subsidiaries, has reported a net profit of \$877,780 for the year ended December 31, 1929, after provision for Federal taxes.

Fisk Rubber Co. and subsidiaries report net loss for 1929 of \$7,496,458 after all charges, including depreciation, writedown, raw materials and finished inventories. This compares with net loss for 1928 of \$8,791,251.

Goodyear Tire & Rubber Co. of California has declared regular quarterly dividend of \$1.75 on preferred payable April 1 to stockholders of record March 20, and Goodyear Tire & Rubber Co. of Canada has declared regular quarterly dividend of \$1.25 on common and \$1.75 on preferred, both payable April 1 to stockholders of record March 15.

General Motors Acceptance Corp. and subsidiaries report net profit for 1929 of \$12,456,635 after all charges. This is equivalent to \$24.91 a share on 500,000 shares of stock and compares with earnings of \$10,418,286, or \$26.04 a share, on stock outstanding in 1928.

Timken Roller Bearing Co. and subsidiaries report net profit for 1929 after all charges of \$14,155,414. This is equivalent to \$5.88 a share and compares with earnings of \$13,730,145, or \$5.70 a share, in 1928.

Perfect Circle Co. stockholders at the annual meeting held March 3 voted to increase the capital stock of the company from 162,000 shares to 250,000 no par value common shares. Additional capital will be used in connection with additions to the present property and acquisition of additional properties.

Gardner Motor Co., Inc., reports total assets as of Dec. 31, 1929, of \$1,818,994 as against \$2,224,184 at the end of 1928. Surplus at the end of 1929 was \$211,425 as against \$641,172 at the end of 1928.

National Show Dates Set

NEW YORK, March 12—The 1931 national shows will be held in New York Jan. 3-10 and in Chicago Jan. 24-31, it was decided today at the monthly meeting of the directors of the National Automobile Chamber of Commerce. The directors also determined to send a representative of the Chamber on a tour of certain South American countries in conformity with invitations extended by various automotive representatives in these countries. General business throughout the country was considered to be favorable, all circumstances taken into consideration. Dealers' stocks of spring models are unusually light for this time of year and dealers have been disposing of used car stocks at an exceptional rate, particularly during February.

Indian Gets Diesel Rights

SPRINGFIELD, MASS., March 13—The Indian Motorcycle Co. has concluded arrangements with Louis Coatalen, of the Sunbeam Motor Car Co., England, for the United States rights to manu-

facture Mr. Coatalen's new Diesel engine. Mr. Coatalen is in this country to attend the speed trials at Daytona Beach, Fla., where Kaye Don will drive the Sunbeam "Silver Bullet" racing car in attempting a new world's speed record.

N. J. Registrations Gain For Cars and Trucks

TRENTON, March 13—Considerable surprise has been occasioned by the large increase in January registrations of new cars and trucks in New Jersey, the reports showing a 60 per cent gain in car registrations and 147 per cent in trucks. A change in the statistical procedure of the New Jersey Motor List Co. is responsible in part, at least, for these large gains.

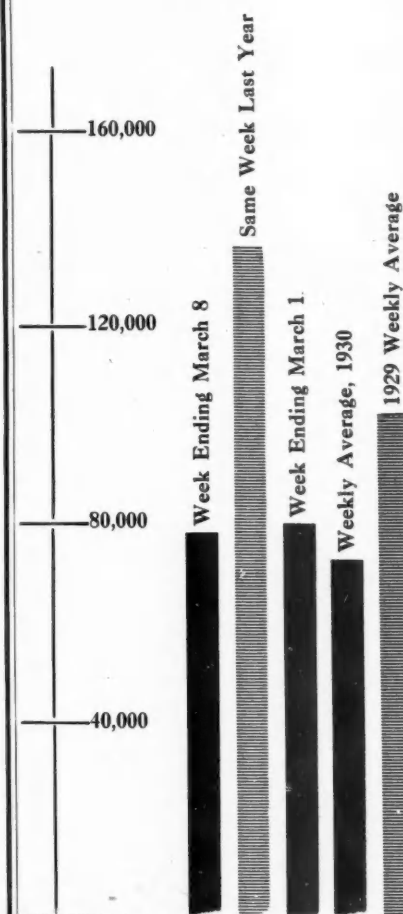
In order to facilitate compilations during the beginning of the year rush, New Jersey figures reported for December included only the first 15 days of that month. Consequently, the January, 1930, figures include all of that month plus the last half of December. Figures

reported a year ago for these two months covered the calendar months so that December, 1929, and January, 1930, figures for new car and truck registrations in New Jersey are not comparable with the same months a year earlier.

General Motors Corp. Gains Stockholders

NEW YORK, March 13—The total number of General Motors common and preferred stockholders for the first quarter of 1930 was 240,483 compared with 198,600 for the fourth quarter of 1929, according to a report from the corporation. There were 218,392 holders of common stock and the balance of 22,091 represents holders of preferred and debenture stocks. These figures compare with 176,693 common stockholders and 21,907 preferred, for the fourth quarter of 1929.

*Automotive Industries
Production Chart
Weekly*



The composite chart appearing above will delineate each week production of passenger cars in the United States and Canada, for the week preceding publication of the issue in which it appears, together with production for the preceding week, and other factors. Data used in compiling it are obtained in confidence from a number of sources. Other factors may be added, dependent upon the cooperation of additional sources of information.

Allied Motor Industries May Widen Its Holdings

W. R. Wilson, President, Tells Directors
of Possibility

NEW YORK, March 12—William Robert Wilson, president of Allied Motor Industries, in his report to stockholders issued last week, intimated the possibility that the company, with which are associated at present the Henney Motor Co., Weatherproof Body Corp., the Van Sicklen Corp., Great Lakes Aircraft Corp. and American Cirrus Engines, Inc., might expand its scope this year to include other organizations in the industrial field outside of the automotive and aircraft industries. He indicated that the present year was characterized by a saner conception of values than was the case last year and that what the corporation has to offer in the way of central management, central banking and a single security as a medium of exchange has drawn to it certain inquiries from other industrial concerns.

"In fact," he concluded, "these fundamental advantages of Allied Motor Industries control are bringing opportunities to us in manufacturing lines outside of the automotive field such as may lead to some change in the original policy of your directors, so as to permit addition to our group of companies not dependent on the automobile and aircraft fields and, in consequence, constituting in a real sense Allied Industries rather than Allied Motor Industries."

The corporation reported net profits for 1929 after all charges of \$211,600. Quarterly dividend of \$1 on preferred stock was declared, payable April 1 to stockholders of record March 15. Officers and directors were reelected.

Phoenix Names Briggs

DETROIT, March 12—Claude A. Briggs, well-known for his long career in the automobile industry, has been named president and general manager of the Phoenix-Detroit Burner Corp., manufacturer of a new type of oil burner. Mr. Briggs was general sales manager of the Wilson Body Co. and more recently was general manager of the Motor Body Division of the Gotfredson Corp. He is a member of the S.A.E. Directors and prominent stockholders of the Phoenix company include Courtney Johnson, sales manager, Hudson Motor Car Co.; E. A. Clark, sales manager, Budd Wheel Co.; William N. McMunn, president of the Michigan Seamless Tubes Co., and Eliot G. Farrington, a retail salesman, Packard Motor Car Co., Detroit sales branch.

Peerless Appoints Latham

CLEVELAND, March 13—James H. Latham has been appointed to the position of export manager of the Peerless Motor Car Corp., James A. Bohannon, president, announced today. Mr. Latham has had considerable experience in the automotive export business, beginning

his business career as a retail salesman for a low-priced automobile in New York City. This was in 1918 and 1919. The following four years he was manager of the automobile department of a large export company.

Gabriel Begins Campaign

NEW YORK, March 12—The Gabriel Snubber Mfg. Co. held a meeting here last week of all distributors in the Philadelphia territory to announce its advertising and merchandising plans for the coming season. This is the first of a series of meetings to be held in various distribution centers throughout the country, according to George H. Ralls, president.

"We are about to launch an aggressive advertising campaign in unquestionably the most concerted effort of selling ever attempted by the company," Mr. Ralls said. "This is being done at this time because we are introducing to the automotive market several new accessories which we are sure will greatly add to the pleasure of motor car owners."

Fokker Returns to U. S.

NEW YORK, March 12—Anthony H. G. Fokker of the Fokker Aircraft Corporation of America, returned yesterday aboard the *S. S. Bremen* after several weeks in Europe. He expressed much interest in the proposed 28-hour, all-plane, coast-to-coast passenger service which has been projected to be established this summer. The DO-X Dornier flying boat is still in the experimental stage, Mr. Fokker pointed out, and it will be some time before the plane is put into active service.

Fuller Appoints Ludvigsen

MILWAUKEE, March 11—E. L. Ludvigsen has been appointed sales manager of the Fuller and Sons Mfg. Co., division of the Unit Corp. of America, according to an announcement from W. H. Schmidt, president of Fuller.

Martin Assembles First of Planned Truck Line

Construction Being Completed at
Garden City Plant

NEW YORK, March 12—The Martin Motor Truck Corp. is just completing the assembly of the first of its demonstration trucks built along the designs of J. V. Martin. This truck is being assembled at the Garden City plant of the company while the erection is going forward on the plant at Waverly, N. Y.

Specifications of the truck are as follows: Overall length 90 in., width 56 in., wheelbase 60 in., track 48 in., normal ground clearance 8 in. The engine is a four-cylinder, air-cooled engine with 2½ in. bore and 3½ in. stroke, giving a displacement of 61 cu. in. Clutch is of single plate disk. Transmission has the conventional three speed forward, one reverse gear box. Controls are of the conventional type. There are no springs or axles on this truck in the usual sense of these words. Wheel suspension is by airplane cord, similar to that employed on airplanes.

The truck has an approximate weight of 750 lb. and is designed for ¼-ton loads. Tires are 26 by 3½. The turning radius is 11½ ft., steering being taken care of by crossrods, pulleys and aviation cable. Service brakes operate on 8½ in. drums on the rear wheels, with the emergency brake operating on 6¼ in. drums on the driveshafts on each side of the differential. The truck is equipped with an electric starter, headlights, tail light, stop light and warning horn.

Cushman Has New Engine

LINCOLN, NEB., March 11—The Cushman Motor Works has recently placed on the market a new fractional horsepower gasoline engine, to be known as the Cushman "Husky." It is designed for general purpose service. The engine is of the single-cylinder, four-cycle, air-cooled type, rated ¾ hp. at 1750 r.p.m. with a total speed range of 1200 to 2000 r.p.m.

Rubber Invoiced to U. S.

WASHINGTON, March 11—American consular officers at Singapore, Penang, Colombo, Batavia, Surabaya, Medan, London and Liverpool, who vise invoices on all rubber shipped to the United States from Malaya, Ceylon, Netherland East Indies, and the United Kingdom, report by cable the following amounts of rubber invoiced during the week ended March 8, 1930, as compared to amounts invoiced in 10 preceding weeks:

1929	Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	TOTAL
Dec. 28	4,943	364	1,856	5	7,168
1930						
Jan. 4	8,067	1,587	2,419	51	12,124
Jan. 11	7,235	931	1,469	15	9,650
Jan. 18	7,009	898	1,560	49	9,516
Jan. 25	9,212	1,103	2,051	14	12,380
Feb. 1	5,078	1,213	1,679	98	8,068
Feb. 8	9,902	1,788	2,572	31	14,293
Feb. 15	7,223	1,312	1,315	59	9,909
Feb. 22	7,010	1,223	2,389	51	10,673
March 1	8,146	2,315	2,898	57	13,416
March 8	6,637	925	1,990	45	9,597

All figures in long tons.

Ford European Plants Study "Minute Costs"

Part of Effort to Pay Uniform Real Wages

LONDON, March 9—Data showing that high wages reduce the unit of cost in mass production and that low wages increase the cost, in Europe as well as America, have been laid before the Ford Motor Co., Ltd., which controls the widely scattered European Ford factories, according to press dispatches. The figures were submitted by Sir Percival Perry, chairman of the company.

Ford production costs in Europe, Sir Percival said, were cheapest in Denmark, where the company paid the highest wages in Europe, and highest in Belgium, where the lowest wages were paid. He added that by raising the minimum wage in the Antwerp factory, the company had obtained an immediate reduction in the cost of production in Belgium.

Sir Percival submitted the data at the company's meeting here Friday and explained that factory experts had evolved a system called "minute costs" showing how long it took the worker in each factory to do his job. This system, which he called also "labor currency," enabled the company accurately to compare this labor production costs in every country despite variations in the monetary system.

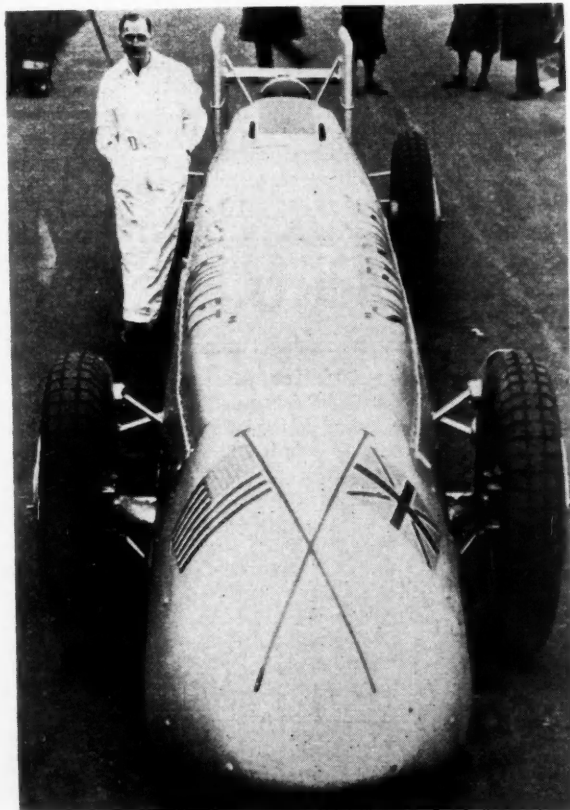
Exports of Aircraft Gain in France

WASHINGTON, March 12—French aircraft exports during 1929 increased considerably, Automotive Trade Commissioner, W. L. Finger, Paris, France, informs the Department of Commerce. Land planes with a total value of 209,531,000 francs (approximately \$8,207,411) were exported as compared with 138,898,000 francs (approximately \$5,446,190) in 1928; seaplanes exported amounted to 4,522,000 francs. The largest markets for French aircraft were Yugoslavia, Belgium-Luxemburg, Turkey, Rumania, Brazil and Indo-China.

Used Car Sales Gain

DETROIT, March 11—The Chevrolet Motor Co. has announced that winter sales of used cars by its dealers are exceeding the best previous winter record by more than 25 per cent. Sales of used cars by Chevrolet dealers in January totaled 60,000, as compared with the January record of 48,000 established last year, according to the report. During the first 20 days of February used car sales totaled 58,922, an increase of 54.4 per cent over the corresponding period last year when 38,176 used cars were sold.

Kaye Don and His "Silver Bullet" Are Prepared to Attack Segrave's Record



Kaye Don, celebrated English racing driver, standing beside the Special Sunbeam racer "Silver Bullet," with which he hopes to break the world's land speed record, held at present by Major Sir Henry O. D. Segrave. The photograph reproduced here was taken in England.

The "Silver Bullet" is equipped with two tandem Sunbeam engines developing about 2000 hp. With these and other features of the chassis designed by Louis Coatalen, such as airplane-type rudders and a controllable stabilizing fin, Don hopes to attain a record of 250 m.p.h. on the Daytona Beach course.

The trials will take place some time between March 15 and 30, and are dependent to a great extent upon weather conditions. Ransom E. Olds will act as official referee, according to the plans which have been announced. Special electrical timing apparatus has been installed and tested, and it will be under A.A.A. supervision when the trials take place.

Chevrolet Announces New Service Plan for Owners

Consumers to Receive Cars Ready to Operate

NEW YORK, March 11—Chevrolet Motor Co. has announced a service plan whereby a service policy is given to each buyer of a new car guaranteeing the delivery of the car thoroughly lubricated, properly adjusted and ready to operate. This policy further entitles the owner to free inspection and adjustment on the car after the first 500 miles and free inspection for every 1000 miles thereafter so long as the car is in operation.

The car is also guaranteed by this policy against defective parts and workmanship within the terms of the Chevrolet standard warranty. This replacement of defective parts or repair due to defective workmanship can be secured from any Chevrolet dealer in the United States regardless of whether the car was purchased from that dealer.

Franklin Deliveries Gain

SYRACUSE, March 10—Retail delivery of Franklin cars in February exceeded deliveries in the same month last year by 20 per cent, H. H. Franklin, president of the Franklin Automobile Company, said here today. This gain, coupled with the January increase, materially surpasses the volume of the first two months of 1929, Mr. Franklin said.

Has New Extinguisher

NEWARK, N. J., March 12—The Pyrene Mfg. Co. has announced a new one pint capacity fire extinguisher, which is specially designed to be mounted on the steering columns of automobiles. It is available in a variety of finishes, including chromium plating, and enamel colors to harmonize with the interior finish of a car.

Graham Producing New Body

EVANSVILLE, IND., March 10—The local Graham-Paige Body Corp. factory began production last week of bodies for the new town sedan as addition to the present line. J. W. Evans, factory superintendent, announced. The factory is averaging 100 bodies a day production with 700 people on the local payroll, he reported.

Budd Orders Gain

PHILADELPHIA, March 10—The Budd Wheel Co., Philadelphia and Detroit, reports sales for the month of February approximately 50 per cent in excess of January. The billings for the last two weeks of February exceeded the billings for the same period last year, which year was the best in the company's history.

Massey Increases Schedule

RACINE, WIS., March 10—A 50 per cent increase in tractor production schedules, bringing output well above a year ago, has been effected in the Racine plant of the Massey-Harris Co., formerly the J. I. Case Plow Works.

Airparts Stockholders Vote to Join Ex-Cell-O

Production Activities Will Be Moved to New Plant

DETROIT, March 10—Stockholders of the Airparts & Tool Corp., at a meeting Thursday of last week, voted to accept the offer of the Ex-Cell-O Aircraft & Tool Corp. to acquire the Airparts company through an exchange of stock. The terms of the acquisition are three-quarters of a share of Ex-Cell-O for each Class "A" share of Airparts and one-half share of Ex-Cell-O for each class "B" share of Airparts. The Airparts company is made up of the Wayne Tool Co., H. R. Krueger & Co. and the Wolverine Screw Co.

It is planned to transfer practically all production activities of the group to the new plant of the Ex-Cell-O company as soon as possible. Such a consolidation of production facilities will increase efficiency of the group materially, it was stated by N. A. Woodworth, president. The approval of the merger plans brings new banking interests into the picture along with Baker-Simonds agreed to purchase jointly Stone & Co., of New York, and Baker-Simonds agreed to purchase jointly 33,000 shares of Ex-Cell-O stock for cash, providing the merger plans were approved by the stockholders. No public offering is planned in connection with the acquisition.

Has New Warning Signal

DETROIT, March 10—A reflecting warning signal, known as the "Teltale," manufactured by the Guide Lamp Corp., Anderson, Ind., has been introduced by United Motors Service. The device can be installed on the rear license plate bracket or affixed to the tail light through a universal bracket which permits mounting on any make of passenger car. The type for commercial vehicles is built with a cup-shaped case which forms its own bracket and can be bolted readily or screwed to any suitable part of the vehicle. The device is claimed to be able to reflect light from all angles up to 30 deg. of its center axis by means of a three-plane triangular reflector and a convex ruby or green lens.

Thompson Adding to Plant

CLEVELAND, March 10—Construction of a one-story brick and steel building of 15,000 square feet as an addition to the main plant of Thompson Products, Inc., Cleveland, located on Clarkwood Rd. S. E., will begin immediately, Frederick C. Crawford, first vice-president and general manager of the company, announced yesterday.

Buys Control of Company

MILWAUKEE, March 10 — The Briggs & Stratton Corp., Milwaukee, has acquired entire control of the I. X. L. Metal Spring Cover Co., Milwaukee, and will convert it into a new division of its extensive interests. Edward J. Forbes, formerly sales manager

of the McKinnon Dash Co., a General Motors subsidiary making fabric spring covers, has been engaged by Briggs-Stratton to direct the sales of the I. X. L. metal cover.

Mexico Plans Road Meeting

WASHINGTON, March 10—The Third Mexican Highway Congress and Exposition will be held from April 20 to 27, at Mexico City, under the auspices of the National Highway Commission, according to a report received in the Department of Commerce from Commercial Attache George Wythe, Mexico City, Mexico. It is proposed to hold a National Convention of Tourism at the same time. It is expected that many visitors will be present during the course of the congress. An exposition of highway machinery is also to be held.



Pan-American Highway

The dream of a continuous highway, connecting all the countries of the Americas, is much nearer realization now that the Mexican Government has definitely settled upon the route that the highway shall take in Mexico. Representatives of the Chicago Motor Club recently traveled over the route, and the accompanying map was developed as a result of their trip. The U. S. Department of Commerce reports progress on various sectors of the highway, week by week, in its "Foreign Highway News."

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, March 12—Although industry and trade as a whole last week continued at levels below those a year ago, wholesale and jobbing lines were stimulated by the warmer weather. There is a great deal of unemployment throughout the country, but the resumption of outdoor work with the coming of spring is expected to bring about considerable improvement.

CONSTRUCTION AWARDS

Construction contracts awarded during February in 37 Eastern States, according to the F. W. Dodge Corp., amounted to \$317,053,000, as compared with \$323,957,000 during the preceding month. Contracts awarded during the first two months of this year were 17 per cent below those awarded during the corresponding period last year.

FARM PRICE INDEX

The index of the general level of farm prices on Feb. 15 stood at 131, based on the pre-war level as 100, as compared with 134 a month earlier and 136 a year earlier.

CRUDE OIL PRODUCTION

Average daily crude oil production for the week ended March 1 amounted to 2,623,950 bbl., as compared with 2,722,050 bbl. for the preceding week and 2,702,900 bbl. for the corresponding week last year.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended March 8 stood at 91.0, as against 91.9 the week before and 92.2 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended March 5 were 11 per cent below those in the corresponding week last year.

STOCK MARKET

The stock market during the earlier part of last week was irregular, but became buoyant on Thursday with the announcement that the Bank of England had reduced its rediscount rate from 4½ per cent to 4 per cent. However, prices showed small net changes for the week. The volume of trading was quite large, and call money ranged from 3½ to 4 per cent. Brokers' loans in New York City increased \$94,000,000 during the week ended March 5.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended March 5 showed decreases of \$34,200,000 in holdings of discounted bills, of \$28,100,000 in holdings of bills bought in the open market and of \$30,700,000 in member bank reserve deposits. There was an increase of \$3,400,000 in holdings of Government securities. The reserve ratio on March 5 was 79.8 per cent as against 78.8 per cent a week earlier and 78.5 per cent two weeks earlier.

Construction Steady, Reports From All Sections Show

Large Garage Projects to be Announced Soon

PHILADELPHIA, March 13—Automotive plant construction held its own last week, according to reports from manufacturing sections of the country. Parts and equipment manufacturers are active in extending their plants. Several garage construction projects, which will total more than \$2,000,000 in value, will be announced soon, it is understood. Among the announcements this week were:

Slee & Bryson, 160 Montague St., Brooklyn, architects, asked bids for a five-story automobile service, repair and garage building, to cost \$150,000 with equipment.

Bakelite Corp., New York (Insulating materials, etc.), asked bids for three-story addition to plant at Bloomfield, N. J., to cost over \$100,000 with equipment. Robert Bolton, Newark, N. J., architect.

Baltimore Airport, Inc., Baltimore, is arranging for hangars, repair and reconditioning shop and other field buildings at airport at Windsor Mill and Rolling Roads, to cost over \$85,000 with equipment.

United States Rubber Co., Detroit, planning installation of additional equipment to cost about \$50,000. A. J. Brandt Co., engineers.

Wheeler Metal Products Corp., Cleveland (automobile parts), has completed a \$200,000 addition to its plant, quadrupling former capacity. Company now has in operation a fully equipped windshield department and also added a rolling department.

Twin Disc Clutch Co., 1325 Racine St., Racine, Wis., is planning construction of a two-story addition which will require considerable equipment.

Aluminum Industries, Inc., Cincinnati, has filed plans for two one-story additions, to cost about \$100,000 including machinery.

Louisville Taxicab & Transfer Co., Louisville, plans multi-story service, repair and garage building, to cost over \$100,000 with equipment. D. X. Murphy & Brother, architects.

City Council, Tampa, Fla., is arranging for a municipal aeronautical program to cost over \$500,000 including purchase of tract known as Drew Field, with construction of hangars, repair shop, oil storage and other units. B. Russell Shaw, St. Louis, consulting engineer.

R. J. Cummins, Houston, Texas, and A. C. Finn, architects, have asked bids for four-story and basement automobile service, repair and garage building, to cost over \$200,000 including equipment.

Lee Tire Chain Industries, Inc., Jefferson City, Mo., is considering new plant at Sedalla, Mo., to cost about \$75,000 with equipment, where operations will be concentrated in future.

Theurer Wagon Works, Inc., New York (custom motor truck and automobile bodies), acquired four-story factory on Hudson



Ford Takes Over \$5,000,000 Assembly Plant

The illustration shows an aerial view of the new assembly plant of the Ford Motor Co. at Long Beach, Calif. Actual assembly will begin April 1. Capacity for 375 cars per day and 2000 workers is provided

Boulevard, North Bergen, N. J., totaling 100,000 sq. ft. floor space for a new plant.

Bloch & Hesse, architects, will take bids on general contract for six-story automobile service, repair and garage building, to cost \$150,000 with equipment.

Farber & Kalbin, architects, plan multi-story automobile service, repair and garage building, to cost over \$350,000 with equipment.

New York City Airport, Inc., Flushing, L. I., plans airport, on property recently acquired, including hangars, repair shops, oil storage and other units, to cost over \$400,000 with equipment. Peter M. Coco, Astoria, L. I., is architect.

Geneva Body Corp., Geneva, N. Y., (automobile bodies) arranged for increase in capital from \$155,000 to 1550 shares of stock, no par value, for expansion.

Granville Bros. Aircraft Corp., Springfield, Mass., considering plans for manufacturing plant.

Raybestos-Manhattan Co., Bridgeport, Conn., (automobile brake lining, etc.) purchased control of Wright & Corson Co., Milford, Conn., manufacturer of rivet and rivet-setting machinery and equipment, and will operate as a subsidiary.

Firestone Tire & Rubber Co., Akron, Ohio, plans three-story factory branch and distributing plant at Baltimore, to cost \$200,000 with equipment.

St. Paul Garage Co., Baltimore, awarded contract to Consolidated Engineering Co. for three-story and basement service, repair and garage building, to cost about \$750,000 with equipment. Wyatt & Nolting, Keyser Building, are architects.

City Council, Fairfield, Iowa, planning municipal airport, including hangars, repair and reconditioning shops, and other units, to cost about \$65,000. A. A. Reichstein, City Hall, city engineer.

Ohio Piston Co., Cleveland, manufacturer of engine pistons, etc., plans addition to cost over \$40,000 with equipment. E. G. Hoefler, architect and engineer.

The Oilgear Co., 655 Park St., Milwaukee, manufacturer of broaching machines and hydraulic feed mechanisms for machine tools, is contemplating the construction of a shop addition.

The Twin Disc Clutch Co., 1325 Racine St., Racine, Wis., manufacturing automotive and industrial power transmission devices, contemplates the erection of a 2-story shop addition, although work may not be started until after July 1 to avoid any interruption of the present heavy production schedule.

The Capital Buick Co. has completed plans for the erection of a one-story addition, 66 x 175 ft. to its sales and service building at 754 East Washington Ave., which was erected during the past year.

Briggs Enters Stamping Field

DETROIT, March 11—George D. Wilson of the Briggs Manufacturing Co., of Detroit, has just announced the entry of his company into the general stamping field. This department of the company will be under the supervision of S. J. Menzel who comes from the Mullins Manufacturing Corp., Salem, Ohio, where he has held the position of manager of sales.

Ohio Sales Decrease

COLUMBUS, OHIO, March 11—Sales of new passenger cars in January were considerably below the levels of previous years in Ohio, according to a recent tabulation of sales of passenger cars made by the Ohio Council, National Automobile Dealers' Association. The report shows that 10,953 passenger cars were sold in January, 1930, compared with 14,220 in January last year. This is a decline of about 23 per cent.

Mooney Says Far East Business to be Normal

Returns From Inspection Trip to Oriental Plants

NEW YORK, March 10—James D. Mooney, vice-president of General Motors Corp. and president of General Motors Export Co., returned yesterday from a trip of inspection of the various overseas units of the company begun on Dec. 7. Most of Mr. Mooney's time was spent in the Orient inspecting General Motors India, Ltd., at Bombay, General Motors Java at Batavia, General Motors China at Shanghai and General Motors Japan at Osaka.

Mr. Mooney found two factors encouraging American business men who are looking toward the export field to anticipate a quick recovery from the retardation of late 1929.

"One," he said, "is the essentially basic likeness of the peoples of all lands. The other is the rapid trend toward the motorization of commercial transportation."

The increasing trend toward motorizing business in the overseas markets is closely paralleling the earlier similar trend of the United States and Europe. The Orient is gradually awakening in a commercial way and the business pace in the Far East on this trip he found much faster than on previous trips. Although the jinricksha will probably continue to be used in Japan for some years to come, the taxi is spreading widely and the highway between Kobe and Osaka is one of the finest in the world. The interior of China is rapidly coming to life and the coast cities continue business about as usual, he finds.

Malaya and Java both have fine systems of improved highways and automobiles and American gas stations are located all over these lands.

"We believe our 1930 business in the Far East will be normal," he concluded.

Crude Rubber Active

NEW YORK, March 10—Crude rubber trading has been fairly active during the past week, with prices declining, according to F. R. Henderson Corp. Final action on the agreement to cease tapping during May has been postponed until March 29 in order that the Dutch interests might secure more complete cooperation.

Stocks of crude rubber in London have been increased to 64,383 tons, with Liverpool stocks up to 20,693 tons. Arrivals at all ports of the United States during the first week of March are estimated at 3700 tons, with probable arrivals for the month placed at 39,500 tons.

Wisconsin Registrations Gain

MILWAUKEE, March 10—While new car registrations in the state of Wisconsin showed a slight decline in January, compared with 1929, there was a gain of 15.6 per cent in February, according to official figures from the secretary of state's office. January registrations were 4415, against 4496,

and February, 4428, against 3831. While new Ford registrations in January were slightly under last year, Chevrolet sales were nearly doubled. In February both Ford and Chevrolet showed substantial gains. So far as all other makes are concerned, gains and losses about offset each other. Since the middle of February passenger car business has taken a turn for the better, and under favorable weather conditions, the first week in March showed a further slight but gratifying acceleration.

Hydraulic Approves Merger

CHICAGO, March 11—Hydraulic Brake Associates, Ltd., has approved a report of a special committee providing for the acquisition of the company by the Bendix Aviation Corp. through an exchange of stock on the basis of five shares of Bendix for six Hydraulic Brake. The latter company is the holding company for the Hydraulic Brake Co., but the approval of stockholders of both companies is necessary to effect the merger.

Chevrolet Registrations Gain

DETROIT, March 10—Chevrolet registrations in January were 39.2 per cent greater than those of January last year, according to a statement by the Chevrolet Motor Co. This showing is based on registration figures from 31 states, figures from other states being unavailable at present. Chevrolet's gain over the corresponding period of last year in these states was 6933 cars. Gains were made in 27 of the 31 states, officials reported.

Woolson, Wright, Warner on Aircraft Program

Will Speak at All-American Show Meeting in Detroit

NEW YORK, March 10—Among the speakers at the All-American Aircraft Show Meeting of the Society of Automotive Engineers to be held at the Book-Cadillac Hotel, Detroit, April 8 to 10, are: Captain L. M. Woolson of Packard Motor Car Co., who will discuss Improvements in Diesel Aircraft-Engine Development; T. P. Wright, engineer of Curtiss Aeroplane & Motor Co., who will describe the Guggenheim prize-winning Tanager, and Edward P. Warner, president of the Society and editor of *Aviation*, who will discuss "How Much is Lightness Worth in an Aeroplane?"

The opinions of operators on changes and developments in aircraft engines will be discussed by E. P. Lott and Wesley M. Smith of National Air Transport, Inc. There will also be a discussion and demonstration of Gliders, the demonstration to be staged at the Municipal Airport, a banquet sponsored by the Detroit Section and an all-day visit to the Ford Motor Co. and Ford Airport.

Heinkel Purchases Factory

BERLIN, March 6—The Ernst Heinkel Flugzeugwerke G.m.b.H., Warnemunde, Germany, has purchased an additional factory with a floor space of about 60,000 sq. ft. This new factory is in Rostock, a city about 10 miles from Warnemunde.



First Russian Ford Leaves the Factory

The first Ford truck assembled under the agreement of the Ford Motor Co. with the Union of Socialist Soviet Republics leaves the plant near Monastirki. The sign above the gateway reads: "The First Soviet Automobile Factory, Nishni-Novgorod, 1929," and the banner displayed on the truck may be translated: "In fulfillment of a five-year pledge"

Yellow Truck Division Earned \$1,177,799 in '29

Net Sales Were \$49,908,177 For
Same Period

DETROIT, March 10—Net sales of the Yellow Truck & Coach Mfg. Co., Pontiac, Mich., for the year ended Dec. 31, 1929, were \$49,908,177. Net profit from operations applicable to the year, before provision for depreciation and income taxes, was \$2,364,222 and after provision for depreciation and income taxes was \$1,177,799. Furthermore, surplus adjustments of \$750,167 applicable to prior years were added to income realized during 1929 so that a total of \$1,927,966 was carried to surplus during the year under review.

Surplus adjustments of \$750,167 applicable to prior years are shown separately on the consolidated statement of income. This amount is in part the result of the adjustment of book inventories to correspond with actual inventories. There is also included in this amount sundry non-recurring losses such as the write-off of the balance of deferred expense incurred in moving the operations of the Chicago plants to Pontiac. Provision has been made for any further losses that may result from the disposal of other properties rendered idle due to the centralization of manufacturing and engineering activities at Pontiac, Mich.

Alexis B. Thielens

CHICAGO, March 10—Alexis B. Thielens, pioneer executive of the Studebaker Corp., died suddenly at his home in South Bend, Ind., according to word received in Chicago. Mr. Thielens was originally with the sales department of the International Harvester Co. at Chicago, but joined Studebaker in 1907. At his death he was president of the Citizens Home Co., home building subsidiary for the Studebaker employees. He was also a member of the finance committee of Rotary International.

Murray Concentrating on Tires

TRENTON, N. J., March 11—The Murray Rubber Co. has given up the manufacture of some mechanical rubber goods and is devoting the plant to the manufacture of tires and tubes. Since the establishment of some 1200 chain stores the company has had to have additional space for the manufacture of tires.

Coming Feature Issues of Chilton Class Journal Publications

Commercial Car Journal and
Operation & Maintenance—Special
Truck Equipment Issue, April,
1930.

Klein Praises Car Art

WASHINGTON, March 13—The development of art in the manufacture of automobiles was interestingly discussed from the standpoint of both its practical nature and its beauty by Dr. Julius Klein, assistant secretary of commerce, in a radio address on "Art in Industry Pays Dividends," broadcast from station WMAL in Washington through the Columbia Broadcasting System last Sunday evening. After telling a story of a Washington government clerk who at nights drove his private car as a taxicab in order to raise funds to buy a current model because he was impressed with its beauty, Dr. Klein referred to the incident as an illustration of the dollar-and-cents value of art in industry.

N.Y. Dealers Hold Banquet

NEW YORK, March 10—The Automobile Merchants Association of New York, Inc., held its sixth annual dinner last Friday evening at the Hotel Plaza. About 600 dealers in cars and accessories in New York and surrounding territory attended this banquet. Among the speakers were Alfred Reeves, general manager, National Automobile Chamber of Commerce; Col. E. V. Rickenbacker, vice-president in charge of sales of Fokker Aircraft Corp., and C. B. Warren, president of the Warren-Nash Motor Corp., who presented a silver platter to C. H. Larson, retiring president.

Forms Canadian Unit

SPRINGFIELD, MASS., March 10—The Gilbert and Barker Mfg. Co. has formed a Canadian subsidiary called the Gilbert and Barker Mfg. Co. of Canada, Ltd., which will establish a factor in Toronto for the manufacture of Gilbert and Barker gasoline pumps and oil tanks for the concern's Canadian trade. Charles C. Ramsdell heads the new subsidiary.

McDarby Sees Increase in Car Sales Impending

Auburn Sales Director Predicts
Spurt at End of Year

AUBURN, IND., March 11—A steady climb in automobile sales, with the latter quarter of 1930 showing a decided spurt, is the prediction of N. E. McDarby, director of sales for the Auburn Automobile Co., following a six-weeks' trip through the Northwest, West and southern parts of the country.

While the Auburn official found that business was spotty in some parts of the country and in certain industries, he also found that there was a decided spirit of optimism among business men generally and particularly in the automobile industry. This optimism, he said, will do more to restore trade to a normal condition than any other factor.

William Hinrichs

MILWAUKEE, March 10—William Hinrichs, one of the founders of the Wisconsin Motor Mfg. Co., Milwaukee, but for some years retired, died in New York on March 3, while on a visit. He was stricken with pneumonia on the train. Mr. Hinrichs was born in Germany in 1863, coming to America when 17. He attended George Washington University, Washington, D. C., and then settled in Milwaukee in 1881. He was one of the founders and for many years president of the Wisconsin Bridge & Iron Co., later assisting in the organization of the Wisconsin Motor Mfg. Co., of which he was an executive until his retirement several years ago. He also founded and was president of the World Trade Club of Milwaukee until his death.

Hexcel Adding Space

MILWAUKEE, March 10—Following the acceptance of the contract to supply the entire radiator requirements of the American Austin Car Co., Detroit, the Hexcel Radiator Co., 57 Erie Street, Milwaukee, is making its third enlargement of plant area and equipment in a year's time. About \$25,000 will be spent for new machinery. Deliveries on the Austin contract are to start early in April. Upon the completion of the present enlargement, the total plant area will be double that of a year ago. F. M. Opitz is president and general manager of the Hexcel company.

Calendar of Coming Events

SHOWS

Detroit (All-American Aircraft)...April 5-13
Asbury Park, N. J., Automobile...April 7-12
Berlin, International Automobile...Nov. 6-16

CONVENTIONS

Society of Automotive Engineers, Aeronautic Meeting, Detroit...April 8-10
Society of Automotive Engineers, Aeronautic Meeting, New York...May 8
National Safety Council, Annual Safety Congress, Pittsburgh...Sept. 29-Oct. 4
Motor and Equipment Association, Convention, Cleveland...Nov. 10-14
American Society for Testing Materials, Regional Meeting, Detroit...Mar. 19

American Society Mechanical Engineers, Fiftieth Anniversary Celebration:
New York...April 5
Hoboken, N. J.April 7
Washington, D. C.April 8-9
National Council Meeting of the U. S. Chamber of Commerce, Washington...April 28
U. S. Chamber of Commerce Annual Meeting, Washington...April 28-May 1
National Foreign Trade Conference, Los Angeles...May 21-23
World Power Conference, Berlin...June 16-25
Railway Supply Mfrs. Assn., Meeting and Exhibit, Atlantic City...June 18-25

American Railway Association, San Francisco...June 23-26
American Society for Testing Materials, Annual Meeting, Atlantic City...June 23-27

RACES

Daytona Beach, Fla., Speed Trials, March 15-30
Indianapolis...May 30
Belgium...July 5-6
Germany (Grand Prix)...July 13
Belgium (European Grand Prix)...July 20
Spain...July 27
Italy (Grand Prix)...Sept. 7
France (Grand Prix)...Sept. 21